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[No. 10.

DISEASES CAUSED BY BACTERIA AND FUNGI

WILLIAMS, R. E. O., & HARPER, G. J. (1947.) *Staphylococcal haemolysins on sheep-blood agar with evidence for a fourth haemolysin.—J. Path. Bact.* 59. 69-78. [Authors' summary copied *verbatim*.]

1736

Nutrient agar plates containing 2 per cent. sheep blood, incubated in air containing 30 per cent. carbon dioxide, were found reliable for the detection of haemolysin production by *Staph. aureus*. Of over 2000 strains tested, 117 produced no haemolysin on the plates and only 27 of these yielded any haemolysin in tube tests. It was not found possible to distinguish on the plate strains that produced β -toxin alone from those producing both α and β .

The plates could also be used for the rapid detection of toxicogenic *Staph. aureus* in mixed cultures.

On sheep-blood plates containing α - or $\alpha\beta$ -antitoxin, a type of haemolysis was produced that is distinct from that due to the α - or β -haemolysin. It was produced only when the plates were incubated in air containing carbon dioxide, but it was equally active on a variety of mammalian bloods, including human. We suggest, tentatively, that it should be referred to as the δ -haemolysin.

JOHLIN, J. M. (1947.) *The effect of temperature and of serum on the detoxification of staphylococcal toxin by interfacial adsorption.—J. Immunol.* 56. 179-181.

1737

Dilutions of toxin in 15% serum and 5% saline and in 20% saline alone were made. 2% washed blood cells were used as an indicator. Controls were used of standard toxin. Detoxification in air is inhibited by low temperature and the presence of serum, both separately and together. Detoxification by chloroform emulsion is not as effective as air, and is not affected by serum or low temperature. However, variations in the chloroform emulsion may affect it.—A. G. W.

WOOD, W. B., Jr., SMITH, M. R., & WATSON, B. (1946.) *Surface phagocytosis—its relation to the mechanism of recovery in pneumococcal pneumonia.—Science.* 104. 28-29.

1738

During the systematic study of the effect of chemotherapy on the pulmonary lesion of pneumococcal pneumonia, surface phagocytosis was shown to occur in the lung in the absence of demonstrable circulating antibody. "Due largely to the profound influence upon immunological thought of the now-classic investigations of Avery and his collaborators, most of the previous studies of the mechanism of recovery in pneumococcal pneumonia have centred about the role of specific antibodies. The methods of classical immunology, however, have failed to reveal why untreated patients sometimes recover from pneumococcal pneumonia before specific antibody is demonstrable in their blood sera, why sulfonamide chemotherapy usually causes a crisis several days before immune bodies appear in the blood, and why phagocytes destroy pneumococci in the lungs of patients dying of pneumonia even when the pneumonic lesion contains large quantities of unbound antiphagocytic polysaccharide. The phenomenon of surface phagocytosis described in this report offers an adequate answer to each of these previously unsolved questions. It also explains the phagocytosis of fully encapsulated pneumococci in experimental pneumonic lesions in the absence of specific opsonins and in the presence of excessive amounts of polysaccharide. In view of the tremendous surface area afforded by the alveolar architecture of pulmonary tissue it seems logical that surface phagocytosis should constitute an important defense against bacterial invasion of the lungs. Preliminary experiments already indicate that this nonantibody phagocytic mechanism operates in other body tissues and is responsible for the destruction of other species of encapsulated microorganisms."—A. A. W.

DE MENDONÇA MACHADO, A. (1945.) *Dois casos de carbúnculo bacterídico em canídeos. [Two cases of anthrax in dogs.]—Repos. Lab. Pat. vet., Lisboa.* 6. 59-61. [English, French and German summaries.]

1739

Anthrax bacilli were recovered from the skin and bone marrow of two dogs that had died on the

eighth day following the eating of anthrax infected ox meat.

This is said to be the first occurrence of anthrax in dogs in the author's laboratory for 30 years. He suggests that many dogs eat anthrax meat, but do not develop symptoms as they ingest the organisms in the vegetative form when they are easily killed by the digestive juices; but if spores have formed in the meat, the dog may become infected.—R. MACGREGOR.

FURNARI, S. (1946.) La lipasi tributirrinolitica dei bacilli similcarbonchiosi dopo virulentazione in vitro e in vivo-contributo alla conoscenza dei rapporti tra funzione patogena ed attivita lipasica. [Lysis of butyryl by lipases of anthracoid bacilli after exaltation of their virulence in vitro and in vivo. Relation of pathogenicity and lipase activity.]—*G. Batt. Immun.* 34. 277-294. [English, French & German summaries: abst. from German summary.] 1740

F. studied the activity on butyryl of the lipases of *B. subtilis*, *B. mesentericus*, *B. megatherium* and *B. pseudoanthracis* before and after enhancing their virulence *in vitro* and *in vivo*. With the object of stimulating not only the metabolic and reproductive but also the lipolytic activity of the organisms, he made numerous and repeated subcultures on to agar and also inoculations into animals. A stimulation of the lipasic activity corresponding to the increase in virulence was always obtained, this stimulation being more distinct in strains with a higher pathogenic activity. F. therefore concludes that there is, at least in this group of organisms, a direct relation between lipasic activity and pathogenic function.

—F. E. W.

PARAF, J., DESBORDES, J., & CAGNIANT, P. (1944.) Etude de l'action de différentes substances synthétiques à-a disubstituées dans la production du phénomène de Koch. [Sensitization to tuberculin by injection of various chemical substances.]—*C.R. Soc. Biol. Paris.* 138. 175-177. 1741

In a previous study [V. B. 14. 408] it was shown that g. pigs can be sensitized against tuberculin by injections of certain fatty acids. In the present study twelve synthetically produced substances (eight fatty acids, an amine, an amide, an alcohol and a ketone) were examined in an attempt to relate the chemical constitution of these substances to the effect of sensitization. In each case the g. pigs were sensitized but to varying degrees.—E. KLIENECKER-NOBEL.

TOMLINSON, K. M. (1948.) Calcium content of skin in lupus vulgaris treated with calciferol.—*Lancet.* 254. 327-328. [Author's summary copied verbatim.] 1742

Healed lupus skin had a higher calcium content than normal skin from non-lupus patients who had not received calciferol. Healed lupus skin had a higher calcium content than non-lupus skin taken from the same patient at the same time.

It is suggested that calciferol makes calcium available to lupus tissue.

JANSEN, J., & VAN DEN HURK, F. G. W. (1945.) Listerellose bij het konijn. [Listeriosis in the rabbit.]—*Tijdschr. Diergeneesk.* 70. 209-210. [English summary.] 1743

JANSEN, J. (1945.) Abortus bij het konijn door listerella-infectie. [Abortion in rabbits caused by *Listeria* [*Erysipelothrix*] *monocytogenes*.]—*Tijdschr. Diergeneesk.* 70. 210-211. [English summary.] 1744

Three fatal cases of infection in rabbits are described in which *Erysipelothrix* (*Listeria*) *monocytogenes* was isolated in pure culture from liver and spleen, and which proved to be pathogenic for canaries in each case.

The first and second cases were both pregnant does. In both cases an inflamed uterus was found on section, and the second had discharge from the vulva during life. Thus J. considers that *E. monocytogenes* can have an affinity for the uterus and thus can be the cause of abortion in rabbits. A case of actual fatal abortion in a rabbit is described in which there was necrotizing endometritis.—F. E. W.

TRUDEL, F. (1947.) A note on a *Salmonella montevideo* infection in chicks.—*Canad. J. comp. Med.* 11. 245-246. 1745

In a hatchery that had been free from pullorum disease for some years, there was a mortality of about 15% in the first three days of life and the breeder was still losing birds up to three months old. *S. montevideo* was isolated from the marrow of leg bones of chicks. This confirms the findings of Edwards that chickens may be a reservoir of this infection. The high mortality during the first three days strongly suggested the possibility that the organism had been present in the eggs.—R. GWATKIN.

OWEN, C. R. (1946.) Acetic acid inhibition of Gram-negative bacilli in culture media.—*J. Bact.* 52. 853-856. 1746

Acetic acid, added in quantities varying from 0.1 ml. of 1% solution to 1.0 ml. of 10% solution to approximately 15 ml. of meat broth was found to inhibit the growth of Gram-negative organisms of the *coli-proteus-pyocyanus* type more than that of Gram-positive organisms, enabling the latter to be isolated from contaminated material. Direct inoculation was useless; the material had to be cultured in routine media for 18 hours before inoculation.

In one-third of cases, staphylococci were inhibited as much as the Gram-negative organisms, but in the majority of cases streptococci were easily isolated.

The appearance of the colonies, haemolysin or coagulase production, Lancefield grouping, or virulence was not altered by this method of culture.

Tubes containing 0·1 and 0·2 ml. of 10% acetic acid are now employed as a routine in the author's laboratory.—R. M. LOOSMORE.

BRAUN, W., & BONESTELL, A. E. (1947.) Independent variations of characteristics in *Brucella abortus* variants and their detection.—*Amer. J. vet. Res.* 8. 886-890.

1747

Dissociation is caused by the spontaneous appearance of a small number of variants which can establish themselves if they have a higher selection value than the original members of the population. The use of the acriflavine test in the detection of the independent variation of characteristics is described. The test may be used macroscopically or microscopically.—S. J. G.

LIVE, I., & STUBBS, E. L. (1947.) Intracutaneous brucellosis tests in cattle.—*Amer. J. vet. Res.* 8. 880-885.

1748

As sonic filtrate of *Br. abortus* when used for skin tests in cattle produced agglutinins, a hydrolyzate was prepared which was non-agglutinogenic. Results of skin tests using this correlated closely with those observed with the use of sonic filtrate. No animals with a negative history and negative to agglutination tests were positive to the hydrolyzate. After a number of tests, cattle were not sensitized to subsequent tests, and blood tests remained negative. However, because of discrepancies between the results of the serological and intracutaneous tests the latter cannot be relied on to diagnose individual cases of brucellosis.

It is suggested that the allergic skin tests might be of value in surveys to detect animals which have been in contact with infected sources.—S. J. G.

HUDDLESON, I. F. (1947.) The immunization of guinea pigs with mucoid phases of brucella.—*Amer. J. vet. Res.* 8. 874-879.

1749

A high degree of active immunity against all three species of brucella developed in g. pigs inoculated with live cell suspensions of certain mucoid phases of *Br. suis* and *melitensis*. Suspensions of *Br. suis* M phase after irradiation with ultra-violet light sufficient to render all but a few cells non-viable, gave a high degree of immunity against *Br. suis* and *Br. melitensis*. Protected g. pigs did not yield agglutination reactions in dilutions of 1:25 or more. Agglutinins rarely higher than 1:1,250 are however produced in rabbits by pure M phase suspensions.—S. J. G.

STEVENSON, J. W., HELSON, V. A., & REED, G. B.

(1947.) Preparation of *Clostridium parabotulinum* toxins.—*Canad. J. Res. Sect. E.* 25. 14-24.

1750

A method is described for the production of large and consistent yields of potent Types A and B *Cl. botulinum* toxins in casein digest-glucose-corn steep medium. The loss of toxin producing activity by highly toxic strains can be prevented by storing young cultures used for inoculum in the cold. Maximum growth in the medium mentioned above occurred in 16 to 18 hours at 35°C.; this was followed by autolysis which is complete in four days in the case of Type B, and in five to six days with Type A. The toxin was precipitated at pH 8·9, purified by suspension and reprecipitation, and dried *in vacuo* by lyophilization or spray drying. Dried toxins remained potent for two years. On a unit weight basis Type A toxin was equally toxic for mice, g. pigs, chickens and goldfish. Type B toxin was 6,000 to 8,000 times more toxic for g. pigs than for mice, chickens or goldfish.—J. FRANK.

I. RICE, C. E., PALLISTER, E. F., SMITH, L. C., & REED, G. B. (1947.) *Clostridium botulinum type A toxoids*.—*Canad. J. Res.* 25. 167-174.

1751

II. RICE, C. E., SMITH, L. C., PALLISTER, E. F., & REED, G. B. (1947.) *Clostridium botulinum type B toxoids*.—*Ibid.* 25. 175-180.

1752

III. RICE, C. E. (1947.) A preliminary study of the antigenic activity of mixtures of *Clostridium botulinum* toxoid types A and B.—*Ibid.* 25. 181-187.

1753

I. Toxoids of high potency in mice and g. pigs were prepared by the treatment of cultures of *Cl. botulinum*, Type A, with 0·5% formalin and incubation for several weeks at 37°C. These toxoids were relatively stable at room temperature and at 4° to 6°C., but lost much of their antigenic activity when held at 37°C. Alum precipitation increased the effectiveness of this toxoid in mice but it was of no greater immunizing value in g. pigs.

II. *Cl. botulinum*, Type B, toxoids were prepared as above. These were good immunizing agents for g. pigs but mice acquired only a low degree of immunity. It was found that the toxins used to prepare these toxoids were highly toxic for g. pigs but had a relatively low toxicity for mice. It is pointed out that diphtheria toxins and toxoids act in a similar manner.

III. The addition of Type A to Type B toxoid was shown to increase the antigenicity of the latter for mice; a comparable or slightly higher degree of immunity was produced in g. pigs. The antigenicity of the Type A toxoid was not enhanced by this mixture, but was only slightly less than the resistance conferred by a similar

volume of Type A toxoid alone. Mixing Types A & B, *Cl. botulinum* toxoids with tetanus in diphtheria toxoids produced no adjuvant effect.

—J. FRANK.

HERNÁNZ, M. (1942.) El botulismo de los équidos en España. [Equine botulism in Spain.]—*Trab. Inst. Biol. anim., Madrid.* 7. 326-344. 1754

Botulism, type C, is common among Equidae in Spain. It may be sporadic, affecting one or two animals in a herd, or it may assume the character of an enzootic. Horses, asses and mules are equally affected. Although considered to occur in per-acute, acute and sub-acute forms, the difference is solely one of the rapidity of the disease. Filtrates from macerated brain, liver, kidneys and lungs contain the toxin, and will produce similar results in experimental inoculation of horses, asses, g. pigs and rats, but sub-inoculation from these is harmless. Bread soaked in filtrate from naturally infected horses and fed to rats produced similar symptoms. The causal organism has not been isolated in Spain.—R. M.

GUNNING, O. V. (1946.) An outbreak of parasitic bronchitis in calves associated with an infection of the lungs with an organism resembling *Bacillus* [*Actinobacillus*] *actinoides*.—*Vet. Rec.* 58. 447. 1755

An outbreak of broncho-pneumonia was reported in a bunch of heifers from 5-10 months old. Treatment for lung-worm infestation was unsuccessful, and treatment with sulphapyridine *per os* was of little use. Later treatment with soluthiazole intravenously followed by sulphapyridine *per os* for a prolonged period resulted in a good recovery rate.

Laboratory examination revealed an organism resembling *Actinobacillus actinoides* in pure culture, with varying numbers of *Dictyocaulus* sp. in the lungs of dead animals.

The author discusses the possibility of the above organism acting as a secondary invader in lung-worm infestation.—R. M. LOOSMORE.

DE MAGALHÃES, O., & ALEIXO, H. B. (1946.) Ensaios de micologia. [Actinomycosis in man and animals.]—*Mem. Inst. Osw. Cruz.* 44. 687-727. [English summary.] 1756

"Tumours" similar to those of actinomycosis can be produced by many irritants, e.g., ligatures of catgut, small solid foreign bodies, etc. Such may, however, be distinguished by the absence of the typical granules in the lesions, and the presence of calcium salts in crystals. In pseudo-actinomycosis, due to *Rhinocloidium beurmanni* there is copious blood-stained pus and the granules are absent. Cases of both types of lesion are described as well as cases of *A. bovis*, *A.*

brasiliensis, *Pro-actinomyces asteroides* and *Mono-sporium apiospermum* infection, and details given for distinguishing the cultures of each.

—R. MACGREGOR.

BTESH, S. (1947.) Infection of man with *Leptospira bovis* in Palestine.—*Trans. R. Soc. trop. Med. Hyg.* 41. 419-426. 1757

Although outbreaks of jaundice in man are common in the Middle East *Leptospira ictero-haemorrhagiae* has never been recorded as the cause. A search for *L. icterohaemorrhagiae* was made in Palestine in 1938 with negative results.

In 1944 a severe type of hepatitis was seen especially in people connected with slaughter houses and in cattle farmers.

At the same time outbreaks of jaundice in cattle had occurred and had been studied and Bernkopf [V. B. 17. 466] had isolated *Leptospira bovis*.

Sera from recovered cases in man were examined by Bernkopf: they did not agglutinate *L. icterohaemorrhagiae* nor *L. canicola*, but did agglutinate, in high titres, *L. bovis* which had been isolated from cows.

The morbidity, distribution, epidemiology and clinical picture of the disease in man are described.—M. C.

EDWARD, D. G. FF. (1947.) Catarrh of the upper respiratory tract in mice and its association with pleuropneumonia-like organisms.—*J. Path. Bact.* 59. 209-221. [Author's summary copied verbatim.] 1758

A catarrhal condition of the upper respiratory tract in mice has been studied.

Intranasal inoculation of affected mice with sterile nutrient broth produced pneumonia in 34.3 per cent. No lung lesions resulted from similar inoculation of unaffected animals. Catarrh of the upper respiratory tract and pulmonary consolidation were transmissible in series by intranasal inoculation of fresh batches of mice. The properties of the infective agent have been investigated.

The same or a similar agent was found contaminating a strain of *R. orientalis* which had been maintained by lung passage in a stock of mice infected with catarrh. No evidence was obtained that the contaminating agent interfered with the usefulness of the strain for producing scrub typhus vaccine, although it probably altered the histological appearances of infected lungs.

Infectivity of the agent was not influenced by administration of sulphathiazole, but lung lesions were apparently prevented by parenteral injections of two organic gold compounds, Myocrisin and Lopion, in sufficient doses.

Some degree of immunity in mice against pulmonary consolidation was produced by a

course of three intraperitoneal injections of living infective material.

From infected tissues pleuropneumonia-like organisms were cultivated on special fluid and semi-solid media. Primary growths did not appear as surface colonies on plates.

Intranasal inoculation of sub-cultures of these pleuropneumonia-like organisms produced catarrh of the upper respiratory tract and pulmonary consolidation in mice.

Intra- and extracellular bodies similar to the cocco-bacillary bodies of Nelson were observed in infected tissues. They were present in the lung lesions produced by inoculation of cultures of pleuropneumonia-like organisms.

It is important to eliminate catarrh of the upper respiratory tract from stocks of mice used for the study of viruses by the intranasal technique.

DUNKLIN, E. W., & PUCK, T. T. (1948.) The lethal effect of relative humidity on air-borne bacteria. —*J. exp. Med.* **87.** 87-101. [Authors' summary copied verbatim.] 1759

The viability of pneumococcus, Type I, sprayed into the atmosphere from a liquid suspension was measured as a function of the relative humidity. When broth, saliva, or 0·5 per cent saline solution is employed as the suspending medium, a very high mortality rate is observed at relative humidities in the vicinity of 50 per cent. However, at humidities above or below this value the microorganisms survive for long periods.

Measurement of the rate of settling of droplets employed in these experiments demonstrated that the disappearance of microorganisms from the air is a true lethal process, rather than a manifestation of aerosol collision processes.

When a saline-free fluid was used, the sharp peak in death rate at intermediate relative humidities disappears.

See also absts. 1842 (gas gangrene); 1843 (bacteriostatic action of aromatic amines, etc.); 1844-1852f (penicillin); 1853 (Brucella abortus); 1854-1859 (various antibiotics); 1864 (fowl typhoid).

DISEASES CAUSED BY PROTOZOAN PARASITES

BARTLETT, D. E., HASSON, E. V., & TEETER, K. G. (1947.) Occurrence of *Trichomonas foetus* in preputial samples from infected bulls. —*J. Amer. vet. med. Ass.* **110.** 114-120. 1761

Experimental data relating to the incidence of *T. foetus* in preputial samples from bulls known to be infected are given as well as records of *T. foetus* infections in two bulls which appeared to be atypical in comparison with other infection which had been studied. The presence or absence of trichomonads was determined by microscopical examination of concentrated samples. A negative result was recorded when two or more slides were prepared and searched without observing the organism. Regular weekly sampling was carried

The lethal effect of intermediate relative humidities on pneumococci atomized from a saline-containing suspension is increased when the particle size of the atomized droplets is increased or when the temperature is raised.

Cultures of hemolytic streptococcus group C and staphylococcus sprayed from a broth medium exhibit the same general survival pattern as a function of relative humidity although the mortality rates are smaller than those of the pneumococcus.

These effects can be explained by assuming the existence of a critical degree of cellular dehydration at which microorganisms become much more sensitive to toxic agents than in states where either more or less water is bound to the cell.

The results presented here may be significant in elucidating certain aspects of the epidemiology of air-borne infections.

BARIATTI, R. (1946.) La dissociazione batterica nella sulfamidoresistenza. [Bacterial dissociation in resistance to sulphonamides.] —*G. Batt. Immun.* **34.** 257-268. [English, French and German summaries: abst. from English summary.] 1760

B. studied whether bacterial dissociation phenomena would induce variations in the sensitivity of micro-organisms to sulphonamides, norvaline (α -amino-*n*-valeric acid) and a sulphonamide-norvaline mixture. It was found that besides being sensitive to these substances in the R phase, *Bact. coli* and *Staph. aureus* are also sensitive *in vitro* in the S phase. Variations in sensitivity were found only in some of the strains examined and were never very pronounced; B. suggests that dissociation does not appear to be the cause of resistance to sulphonamides and norvaline.—F. E. W.

out. Examination of a total of 800 preputial samples from ten infected bulls revealed the presence of *T. foetus* in 68·88%. Eight bulls showed *T. foetus* in approximately 45-85% of their weekly samples and periods of more than two negative samples in these bulls were infrequent. Such infections were considered typical. The infrequent occurrence of *T. foetus* in the preputial samples of two bulls, only 19·5% being positive in one case and 8·51% in the other, were considered atypical. It is pointed out that no experimental data so far presented indicate that the chance of finding *T. foetus* is materially improved by the use of culture media. Applications of the experimental findings to diagnosis of

bovine trichomoniasis are summarized together with an account of the procedure to be adopted in examining the bull.—C. HORTON SMITH.

TRUSSELL, R. E. (1946.) Microagglutination tests with *Trichomonas vaginalis*.—*J. Parasit.* 32. 563-569. 1762

Little attention has been given to the immunology of human vaginal trichomoniasis but there is evidence of circulatory antibodies against *Trichomonas vaginalis*. The author describes microagglutination tests with sera from experimentally immunized rabbits and with blood specimens obtained from syphilitic or pregnant women. A bacteria-free strain of *T. vaginalis* was cultivated in cysteine - peptone - liver - maltose medium which is described in an appendix. The organic components of the medium used for production of the antigen were cysteine, maltose, rabbit serum, rabbit liver infusion, peptone and agar. After culture for two days at 35°C. three washings with Ringer's solution were made and the organisms were then counted and diluted to the desired number of organisms per ml. Suspensions of living organisms were used as such or subsequently to the addition of final concentrations of 1 : 2,000 formalin and 1 : 20,000 phenyl mercuric borate. Five rabbits received living organisms intravenously, three received killed organisms intravenously, and two received killed organisms subcutaneously. The period of immunization was 13 weeks. Five or six blood samples were collected from each rabbit. 42.5 million to 74.5 million organisms were injected into each animal. The clumps of organisms were unstable in the macroagglutination tests and the end points difficult to read, so that the technique was abandoned in favour of a microagglutination test. The antigen antibody mixtures were prepared in M/15 Na₂HPO₄ by mixing 0.5 ml. of the various dilutions of each serum to be tested with 0.5 ml. of antigen (2,000,000 protozoa/ml.). After shaking, 0.02 ml. of each mixture was pipetted on to a squared slide and incubated for four hours at 37°C. and then examined microscopically. The endpoint was given in the last dilution of the serum in which a few small clumps occurred. Living organisms injected intravenously produced higher agglutinin titres than did killed organisms given intravenously which, nevertheless, gave better results than subcutaneous injections of dead organisms. The results of the work show that *T. vaginalis* can be studied by known serological techniques and that the protozoon stimulates the production of antibodies in experimentally inoculated animals. Similar antibodies exist in low titre in the sera of a small percentage of pregnant and syphilitic women.—C. HORTON SMITH.

WENRICH, D. H. (1946.) Culture experiments

on intestinal flagellates. I. Trichomonad and other flagellates obtained from man and certain rodents.—*J. Parasit.* 32. 40-53. 1763

Suggestions have been made that morphological changes of trichomonad flagellates may take place under cultural conditions and so invalidate specific distinctions. Time and labour were saved by attempting to prolong the life in individual cultures by adding nutrients from time to time and by replacing with distilled water losses by evaporation, instead of subculturing. Host-parasite relations were also considered as a flagellate living *in vitro* has more advantage in reaching a new host than one that can live only with difficulty outside the host. Other points considered in this connection were that the flagellate of a warm-blooded animal that will survive at room temperature will no doubt have a better chance of reaching a new host than one that requires a temperature near to that of its host; also an intestinal flagellate that can develop in cultures consisting of nutrients added to water is in a better position to reach a new host than one that cannot live in water. The cultures were maintained in test tubes with cotton plugs. Approximately 10 ml. of fluid were added to each tube and the nutrient materials were primarily gastric mucin and Difco Loeffler's dried blood serum each employed at a concentration of 0.2%, these were usually dissolved in Drbohlav's modified Ringer's fluid or in ordinary Ringer's (with 0.8 g. NaCl) diluted with pond or distilled water. The nutrients when required for the maintenance of cultures in single tubes were added as dry powders, or if fluid was to be restored after loss by evaporation, it was dissolved in pond or distilled water. It seemed that accumulation of waste-products is slow and that exhaustion of food supplies is more important in bringing about the decline of the culture populations. *Trichomonas hominis* does not appear to live for long in water or in cultures made by adding nutrients or faeces to water. The same species from a rat lived 107 days in 1/4 strength Ringer's containing 0.2% gastric mucin. W. considers that the caecal protozoa of the hamster are identical with those of rats. *T. wenyonii* was found in the mouse *Peromyscus nuttalli* and the g. pig. The caecal contents of a pocket gopher (*Thomomys bottae*) yielded a species of *Monocercomonoides* which persisted for 213 days in an original culture in Drbohlav's Ringers modification and gastric mucin at room temperature but did not survive for more than 69 days in cultures incubated at 35°-36°C. *T. muris* and *T. minuta* could not be cultivated. Several species of *Retortamonas* and *Monocercomonoides* are easily cultured and W. suggests that the positive correlation between ease of cultivation

and widespread host associations for the species of these two genera may be significant.—C. H. S.

HUFF, C. G., & COULSTON, F. (1946.) The relation of natural and acquired immunity of various avian hosts to the cryptozoites and metacryptozoites of *Plasmodium gallinaceum* and *Plasmodium relictum*.—*J. infect. Dis.* 78. 99-117.

1764

The discovery of tissue stages existing between the sporozoite and erythrocytic stage of malarial parasites has raised some important issues: have the tissue stages equal, less, or greater specificity of hosts than the erythrocytic stages: *i.e.*, is the natural immunity of various hosts equally effective against pre-erythrocytic and erythrocytic stages of the parasites? It is also of importance to know whether the acquired immunity of a host against erythrocytic stages is also active against sporozoites and pre-erythrocytic stages. Adult and young chickens and ducks, adult geese, guinea-fowl and canaries were used for the development of cryptozoites of *P. gallinaceum* and adult pigeons and canaries were used for similar work on *P. relictum*. The presence of latent infections of *P. gallinaceum* in the blood of some of the birds was tested in small chicks. *Aedes aegypti* was the mosquito used for growing sporozoites of *P. gallinaceum* and *Culex pipiens* for growing the sporozoites of *P. relictum*. The canary was found to be naturally resistant to both erythrocytic and pre-erythrocytic stages of *P. gallinaceum*. Numerous and normal pre-erythrocytic stages of *P. gallinaceum* were produced by sporozoites in the skins of ducks and geese. Only short-lived and light

parasitaemia occurred in geese inoculated with the sporozoites of *P. gallinaceum*. Repeated inoculations of numerous sporozoites of *P. gallinaceum* into ducks failed to produce patent parasitaemia but subpatent infections were sometimes evident in ducks after the inoculation of sporozoites or infective chicken blood and lasted for at least eight months. No immunity to *P. gallinaceum* in chickens was obtained by inoculation of whole blood, serum or plasma from ducks. Short-lived and light parasitaemia was produced in ducks inoculated with sporozoites by repeated inoculations of chickens' blood but although many parasites were in the introduced chicken cells some were in the erythrocytes of the duck. It seems that chicken cells could be infected although they were bathed in ducks' plasma and that the presence of chicken blood in the duck allowed parasitism of some of the duck's erythrocytes. *P. gallinaceum* in the duck behaved in a similar way in the guinea fowl but no subpatent infection occurred after inoculation of sporozoites. *P. relictum* produced both pre-erythrocytic and erythrocytic stages in canaries but in pigeons only pre-erythrocytic infections and only occasional parasitaemia. In the case of *P. gallinaceum* normal pre-erythrocytic stages followed test inoculations of sporozoites into chicken and ducks repeatedly immunized by massive inoculation of both sporozoites and trophozoites. The authors discuss a classification of exoerythrocytic stages of malarial parasites and propose the term *phanerozoite* for those exoerythrocytic stages occurring late in the infection.—C. HORTON SMITH.

See also absts. 1798 (tsetse fly control); 1799 and 1800 (tick-borne diseases); 1866 (trichomoniasis); 1867 (coccidiosis).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

CLARKSON, M. R. (1947.) Some facts concerning the eradication program in Mexico.—*J. Amer. vet. med. Ass.* 111. 359-360. Discussion pp. 360-362.

1765

The campaign against F. & M. disease in Mexico was directed by a joint U.S.A.-Mexican Commission. More than 250 employees of the U.S. Bureau of Animal Industry were in Mexico and more were needed. No research work on F. & M. disease was being carried out in the U.S.A. but close contact was maintained with research workers in Gt. Britain and in Mexico.

In the discussion the value of a fence along the boundary between Mexico and the U.S.A. was stressed.

The virus present was stated to be a modified "A" type.—M. C.

GILLIE, G. W. (1947.) Report on inspection of infected areas in Mexico by a congressional

committee.—*J. Amer. vet. med. Ass.* 111. 356-359.

1766

The steps taken by the Government of the U.S.A. from December, 1946, when reports of the first cases of F. & M. disease in Mexico were received, are briefly reviewed. Nine million dollars were voted for the campaign and during the fiscal year 1947 it was estimated between 50 and 60 million dollars would be expended. There was strong opposition in Mexico to the slaughter policy and education of the farmers was necessary to obtain co-operation. 15,000 soldiers of the Mexican army were employed in controlling quarantine regulations, road blocks and disinfecting stations. The plan has been to hold the disease in the north and drive it back southwards and eastwards. Infection was scattered over an area of some 80,000 square miles with a cattle population of 2,500,000.—M. C.

SUTTON, G. D., & MARAIS, S. J. S. (1947.) **Destruction of rabies carriers at Grootfontein College of Agriculture.**—*J. S. Afr. vet. med. Ass.* 18. 82-84. **1767**

The carriers of rabies at Grootfontein were not dogs but various species of small carnivores and rodents such as the mongoose (*Cynictis pectillata*) and ground squirrel (*Geosciurus capensis*) (see SNYMAN—*V. B.* 14. 53). The methods used were trapping, poisoning and gassing of burrows. A gang was specially trained for the work and took six weeks to clear an area of about 1,000 morgen [1 morgen = 2½ acres]. The poison bait used contained strychnine 2 grains, sugar 2 oz. and maize meal 1 lb. Cyanogen was used for gassing burrows. It is stated that the campaign would not have been successful without the use of poison baits.—M. C.

ARRIGHI, R. (1946.) Cas de rage à incubation très courte, au Cambodge. [A case of rapidly developing rabies at Cambodge (Indo-China).]—*Rev. Med. vét., Lyon et Toulouse.* 97. 578-581. **1768**

Four cases of rabies in dogs with short incubation periods (16 and 18 days) are described. Such cases are said to be not uncommon in Cambodia.—M. C.

SMITH, M. G., BLATTNER, R. J., HEYS, F. M., & MILLER, A. (1948.) **Experiments on the rôle of the chicken mite, *Dermanyssus gallinae*, and the mosquito in the epidemiology of St. Louis encephalitis.**—*J. exp. Med.* 87. 119-138. [Authors' summary copied verbatim.] **1769**

The present experimental results concern primarily the question, whether or not mosquitoes feeding on chickens having viremia, as a result of the bite of infected mites, can acquire the virus of St. Louis encephalitis and whether or not mosquitoes thus infected, can transmit the virus to chickens and hamsters.

During the course of the investigation, 7 species of mosquitoes of 3 genera were infected with the virus in one or two or all of three ways: by feeding on a suspension of infected mouse brain tissue, by feeding on chickens in which viremia had been produced by subcutaneous inoculation of virus, and by feeding on chickens having viremia as a result of the bite of infected mites. These mosquitoes transmitted the virus to chickens at periods varying from 5 to 38 days after the infective meal.

The virus of St. Louis encephalitis was transmitted to hamsters by *Culex pipiens* at periods varying from 4 to 27 days after feeding on chickens having viremia as a result of the bite of infected mites. While viremia was demonstrated readily in hamsters, signs of encephalitis did not develop.

In all transmission experiments the method of chorioallantoic passage proved necessary for the demonstration of viremia.

A concept of the epidemiology of St. Louis encephalitis is presented: two blood sucking vectors may be involved, one an arachnid, the mite, maintaining the virus in nature by transovarial passage, and the other, an insect, the mosquito, which carries the infection from birds to other vertebrates including man.

BEAUDETTE, F. R., & HUDSON, C. B. (1945.) **Additional outbreaks of equine encephalomyelitis in New Jersey pheasants.**—*J. Amer. vet. med. Ass.* 107. 384-386. **1770**

With the exceptions of 1941 and 1942 equine encephalomyelitis has been diagnosed every autumn since 1938 in pheasants in New Jersey. In both 1943 and 1944 virus was isolated from pheasants on the same farm. This suggests a carrier state in pheasants. The available data did not reveal that equine encephalomyelitis in pheasants was more frequent in years in which the incidence was high in horses. During two years the disease was diagnosed in pheasants with no reported cases in horses.—F. D. ASPLIN.

LABZOFFSKY, N. A. (1946.) **Effect of reducing agents on the viability of equine encephalomyelitis virus (eastern type).**—*Canad. J. Res. Sect. E.* 24. 119-133. **1771**

The effect of the presence of three different reducing agents on the viability of equine encephalomyelitis virus (Eastern type) was studied with a view to obtaining a better medium in which to store these agents than the broth or phosphate buffer solutions commonly used. Of these, cysteine hydrochloride was the most effective. Virus suspended in a 1 : 1,000 dilution of this agent was still infective after 14 days at 37°C., although the titre for g. pigs had fallen from 10⁻⁸ to 10⁻². A similar reduction in titre occurred in suspensions of virus in 0.85% sodium chloride solution in 24 hours at 37°C.; and in buffered saline in 120 hours at the same temperature. The titre of the virus was maintained for 48 hours at 37°C. in cysteine hydrochloride solution at an Eh range between -0.151 and +0.02 volts; the virus also retained its infectivity over a like period at a pH of 4.8 to 8.2. The other two reducing agents studied, sodium formaldehyde sulphoxylate and sodium thioglycollate, had no conserving effect on the infectivity of the virus *in vitro*.—C. E. RICE.

ZULIŃSKI, T. (1945.) **Studia anatomo i histopatologiczne nad zakaźnym zapaleniem mózgu u konia i królika (rekonstrukcja).** [Pathology of infectious encephalitis in the horse and rabbit.]—*Med. Wet.* 1. 47-57. [Abst. from French summary.] **1772**

The first part of this paper deals with an infectious encephalitis in horses which occurs in Poland. Z. describes the histology of the lesions in the central nervous system. The cause is a filtrable virus which is pathogenic for rabbits but not for pigeons.

The second part deals with a naturally occurring infectious encephalitis in rabbits. No bacteria have been isolated from the affected tissues and it is believed that the cause may be a virus. The characteristic lesion is perivascular cuffing.—M. C.

—. (1947.) New England's "Swamp Fever" epizootic.—*J. Amer. vet. med. Ass.* 111. 366-368. 1773

Equine infectious anaemia was suspected in horses stabled at a racecourse in New Hampshire in August, 1947, the diagnosis was confirmed by horse inoculation tests at Beltsville in September.

The first case probably occurred in a horse from Florida which died in May. It is suspected that infection had been spread, before the condition was diagnosed, by means of hypodermic syringes used by owners and trainers to inject such drugs as sulphonamides and penicillin: this is believed to have been a major factor in spreading the disease.

Slaughter of infected horses is apparently not compulsory and it is stated that to encourage owners to destroy affected horses the Thoroughbred Racing Association of the U.S. Inc. has offered to compensate owners.

Up to October 1st, 46 horses had died or had been destroyed and 15 confirmed cases were on hand.—M. C.

MORNET, P. (1948.) Prophylaxie médicale de la peste bovine en Afrique Occidentale Française. Le virus-vaccin capripestique. [Immunization against rinderpest in French West Africa.]—*Bull. Serv. Elev. Industr. anim. A.O.F.* 1. 5-22. 1774

M. discusses the methods available for immunizing cattle against rinderpest and rejects as unsuitable (a) serum alone as too costly and conferring too brief an immunity, (b) serum plus tissue vaccine as too costly and uncertain in its results and (c) tissue vaccine followed by virulent blood because to be successful it is necessary to be able to round-up again all the vaccinated cattle and to have a supply of virulent blood available at the right moment and it is not always possible to do so.

He then discusses the remaining methods. Simultaneous inoculation with virus and serum has disadvantages, namely, danger of heavy losses particularly if the cattle are in poor condition, risk of spread of infection and high cost of serum.

Vaccination with formalized vaccine is free from any risk of spreading infection and is an excellent method for free areas which are in danger of becoming infected; its disadvantages are cost of the vaccine (it is necessary to slaughter one calf to obtain sufficient vaccine for 60 cattle), the short duration of the immunity and the difficulty of testing vaccine for potency before issue.

Rinderpest in goats, the development of the goat-adapted virus at Muktesar and in Kenya, and the history of the use of goat-adapted virus in various African territories are reviewed. The advantage of dried spleen tissue as a source of virus is stressed as compared with fresh blood. This method of immunization has recently been introduced into the French African colonial territories and preliminary results are satisfactory.

—M. C.

GIRARD, H., & CHARITAT, M. (1947.) La vaccination antipeste au Soudan à l'aide du virus pestique caprin. [Vaccination against rinderpest in the Sudan with goat-virus.]—*Rev. Elevage Méd. vét. trop.* 1. 7-15. 1775

This is an account of trials with goat-virus on a small number of calves using a strain of goat-virus obtained from Nigeria. Reactions were slight and immunity on test inoculation with virulent blood about six weeks later was solid. Following the preliminary trials a total of 5,552 cattle were vaccinated in the field with a mortality of 1%. It is stated that experiments demonstrated that infection by contact with vaccinated cattle did not occur, but details are not given of these experiments. The local breeds of goats react very mildly to infection with the goat-virus. [In a preliminary note it is stated, erroneously, that Saunders & Aggyar were the first to attenuate the rinderpest virus by passage through goats and that the Nigerian strain of goat-virus originated at Mukteswar].—M. C.

MORNET, P., & RECEVEUR, P. (1942.) Lésions de la caillette et de la valvule ileo-caecale. Leur spécificité appliquée au diagnostic "post mortem" de la peste bovine. [Lesions of the abomasum and ileo-caecal valve in rinderpest and other diseases.]—*Bull. Serv. zootech. Epiz. A.O.F.* 5. 77-90. 1776

The authors discuss the diagnostic value of the lesions of the abomasum and the ileo-caecal valve in rinderpest. They made a systematic examination of 41 consecutive cases of rinderpest in cattle experimentally infected for the preparation of spleen vaccine and which were slaughtered between the 7th and 11th days after experimental infection. Three of these cattle had no lesions, eight had lesions in the abomasum only, ten in the ileo-caecal valve only and 20 had lesions both

in the abomasum and the ileo-caecal valve. In many cases the lesions were slight.

The incidence of lesions of these parts of the alimentary tract in other infectious and non-infectious diseases is also discussed, for example in salmonellosis, F. & M. disease, rabies, piroplasmosis and theileriosis.

The incidence of abomasal and ileo-caecal lesions in 207 cattle between the ages of 2½ and 15 years slaughtered for meat at the abattoirs at Niamey and Dakar was studied. Various types of lesions of the abomasum were found in 126 of these cattle of which 43 were classified as slight, 39 as moderate and 44 as marked. Lesions of the ileo-caecal valve were present in 125. The cause of these lesions in apparently healthy cattle could not be determined with certainty, but it was thought that the majority of cases were due to mechanical injury and subsequent secondary invasion.

The authors conclude that there is no specific rinderpest lesion of the abomasum or ileo-caecal valve and that it is not possible to base a diagnosis on the examination of these parts alone. They must be interpreted in the light of the whole picture presented by the carcass.—M. C.

SHOPE, R. E. (1947.) Experimental wartime studies on rinderpest.—*J. Amer. vet. med. Ass.* 110. 217-218. 1777

This is a short semi-popular account of rinderpest and of the work done at Grosse Isle during the war on the cultivation of rinderpest virus on the chick-embryo with a view to its attenuation and the production of a vaccine. It is stated that rinderpest is a disease which is "not too easily recognizable" and that on P.M. examination of the cattle used at Grosse Isle there "was little that was characteristic".

Adaptation of the virus to the chick-embryo was accomplished in two stages, first on the chorioallantoic membrane and later via the yolk sac. Serial passage on the yolk sac led to progressive attenuation until a stage was reached at which the virus was non-pathogenic to cattle but immunized them against experimental infection. The vaccine as finally prepared was especially fragile and required great care in handling.—M. C.

SHENG, T. S. (1946) Virus encephalomyelitis in buffaloes.—*Science.* 103. 344-346. 1778

A disease of buffaloes occurs in the western part of the Szechwan province in China. The features of the disease are higher incidence in winter than in summer, all ages of buffalo are affected and the onset is usually abrupt. Paralysis of the hind legs is the first symptom, later the fore limbs are also paralysed. The temperature is subnormal. Consciousness is retained and excite-

ment is absent. Mortality is about 95% and death usually occurs within one or two days of the commencement of symptoms.

On P.M. examination there are haemorrhages under the meninges and petechiae through the spinal cord. Haemorrhages may also be present in other organs such as the intestines, urinary bladder, trachea and endocardium. No bacteria can be isolated from the blood or C.N.S. On histological examination of the C.N.S. there is degeneration of the nerve cells, the cytoplasm of which may be either swollen or shrunken. The changes are particularly marked in the pyramidal cells of the cerebral cortex and hippocampus. Perivascular infiltration is seldom present. Inclusion bodies have not been found.

Transmission was effected by means of sterile Seitz filtrates of brain and spinal cord to rabbits, pigeons, buffalo and goats. The incubation period in experimental animals varied from 1-58 days. Attempts to cultivate the virus on chick embryo failed.

Work is in progress on the disease and a further report is promised.—M. C.

GREEN, R. G. (1945.) Temperature reactions in dogs to inoculation with ferret passage distemper virus.—*Proc. Soc. exp. Biol., N.Y.* 58. 103-105. 1779

The inoculation of 54th generation of ferret-passage distemper virus into dogs produced a mild infection with a typical diphasic temperature reaction. The temperature reaction was not altered by variation of the dose of vaccine. In dogs inoculated with 63rd generation passage virus a dose of 2.5 mg. produced a prolonged diphasic reaction while a dose of 15 mg. produced only a single rise of temperature which gradually declined to normal.—M. C.

CATCOTT, E. J. (1948.) Results obtained from the prophylactic use of distemperoid vaccine.—*N. Amer. Vet.* 29. 160 & 162. 1780

An account of the results obtained in the field during a period of four years. It was possible to follow the history of 93 of the dogs which were vaccinated. Of these 93 dogs only 31 had a recognizable reaction in the first week following vaccination, in three of these the reaction was severe, one dog dying and the other two developing chorea. Four dogs developed symptoms of distemper after at least one month had elapsed from the time of vaccination.

Care was taken to vaccinate only dogs which were in good condition and free from intestinal parasites.—M. C.

JONAS, S. (1947.) The comparative efficacy of Green and Laidlaw-Dunkin distemper vaccination.—*J. Amer. vet. med. Ass.* 111. 48-49. 1781

Prior to 1944 J. had vaccinated 224 dogs by the Laidlaw-Dunkin vaccine virus method and the results are compared with those obtained in 300 dogs vaccinated with Green's ferret adapted virus.

In the 224 vaccinated by the Dunkin-Laidlaw method there were 14 deaths from distemper and two from encephalitis. In the 300 vaccinated by Green's method there were no deaths from distemper and 15 deaths from encephalitis: there was some evidence of variation in different batches of the Green vaccine and it is considered that a greater degree of standardization should be attained.—M. C.

SYVERTON, J. T., & LARSON, C. L. (1947.) **Intranuclear inclusion bodies in the kidneys of wild rats.**—*Arch. Path.* **43.** 541-552. [Authors' summary copied verbatim.]

1782

The kidneys from 139 wild rats (*Rattus norvegicus*) captured in widely separated parts of the United States were examined microscopically for the presence of intranuclear inclusion bodies. When it was found that Cowdry's type B intranuclear inclusion bodies were present in the epithelial cells of the renal tubules of 68 rats (49 per cent), two groups of experiments were carried out to learn whether the causal agent was infectious in nature or a chemical.

Albino rats of the Wistar strain were used as experimental animals. To rule out preexisting inclusion bodies in the kidneys, one kidney from each albino rat was removed for microscopic examination forty-five days before use of the rat.

The first group of experiments employed fresh renal tissues that were known from examination of sections prepared by the frozen section technic to contain numerous inclusion bodies. Filtered and unfiltered suspensions of these tissues were injected into 33 normal albino rats by subcutaneous and intraperitoneal routes. When animals were killed in from three to eighty-four days after injection, none showed any inclusion bodies.

In the second series of experiments, Willstätter's type C alumina gel (0.2 to 0.5 cc. in one or two doses) was injected intravenously into 29 rats. Of these, 15 survived and died or were killed in from thirteen to ninety-four days after injection. Again, in none of the rats were intranuclear inclusion bodies found.

OSTEEN, O. L., & ANDERSON, W. A. (1948.) **Laboratory diagnosis of Newcastle disease [avian pneumoencephalitis].**—*J. Amer. vet. med. Ass.* **112.** 40-44.

1783

Owing to the frequent difficulty of obtaining suitable material for the isolation of virus a study was made upon the reliability and merits of the

haemagglutination-inhibition (H.I.) and serum neutralization tests (S.N.) for Newcastle disease. Positive H.I. titre appeared somewhat earlier than positive S.N. titre. When a positive diagnosis was based on an H.I. titre of 80 or more and an S.N. titre of 10^3 , there was good agreement between the results of the two tests. It is considered that a composite serum sample having the ability to neutralize 10^3 embryo M.L.D. of Newcastle disease virus is satisfactory evidence of exposure to infection.

The results of H.I. and S.N. tests conducted by a number of laboratories showed satisfactory agreement.—F. D. ASPLIN.

JACOTOT, H. (1947.) **Vaccination contre la variole aviaire au moyen de pulpes tissulaires, stérilisées par le formol. [Formolized fowl pox vaccine].**—*Rec. Méd. vét.* **123.** 413-416. 1784

Fowls were infected by intramuscular injection into the breast muscles. When the fowls died the breast muscles were collected, ground, and to a suspension of the ground muscles formalin and aluminium hydroxide were added to make a vaccine. (The concentrations of formalin and aluminium hydroxide are not stated.) The vaccine is said to keep well for some weeks. A number of trials were made with somewhat variable results.—M. C.

MOLGARD, P. C., & CAVETT, J. W. (1947.) **The feather follicle method of vaccinating with fowl laryngotracheitis vaccine.**—*Poult. Sci.* **26.** 563-567.

1785

Laryngotracheitis vaccine when applied by the feather follicle method produces as good an immunity as it does when applied into the vent or bursa Fabricii. The feather follicle method was considered preferable to the vent method as very little exudate was expelled from the follicles as compared with that from a heavy reaction in the vent. Follicle vaccinations gave a higher percentage of reaction takes than were produced in chickens vaccinated in the vent and in addition, the problem of the "watery vent", and subsequent dilution of vaccine, was overcome. The authors claim satisfactory results for the follicle vaccination method as practised in the field.

—J. D. BLAXLAND.

GOLUB, O. J., & WAGNER, J. C. (1948.) **Interference between human pneumonitis virus and psittacosis virus.**—*J. Bact.* **55.** 627-636. 1786

Interference effects were demonstrated in mice when human pneumonitis virus (S-F strain) was inoculated by the intra-abdominal route followed immediately, or at short intervals, by psittacosis virus (6BC strain) inoculated by the same route. Although active S-F virus reached the brain within a few days under such conditions,

the mice did not show an increased intracerebral resistance to psittacosis virus until a longer interval had passed, at which time the S-F virus in the brain was disappearing. The resistance was only slight and due probably to cross immunization.

When human pneumonitis virus was inoculated directly into the brains of immunized mice, no rapid increase in resistance to psittacosis virus by the intracerebral route was observed beyond that engendered by the S-F immunizing injection. These results indicate that the mere presence of living S-F virus in the brain, shown by carrier studies, does not necessarily produce interference effects.

It would appear that cross-immunity studies between these two viruses are not complicated by the interference phenomenon when the intracerebral route is used for challenge. When the intra-abdominal route of challenge is employed, however, a resistance not entirely due to antigenic cross immunity may be found.

DOWNIE, A. W., & DUMBELL, K. R. (1947.) The isolation and cultivation of variola virus on the chorio-allantois of chick embryos.—*J. Path. Bact.* 59. 189-198. [Authors' summary copied verbatim.] 1787

The macroscopic and microscopic appearances of the lesions produced by infection of the chorio-allantoic membrane of developing hens' eggs with variola virus are described.

The lesions produced by strains of virus from 20 cases of variola were characteristic and did not alter appreciably on repeated transfer of one strain through sixteen successive passages ; they could readily be distinguished from those caused by vaccinia virus.

The technique affords a sensitive test for the detection of variola virus in vesicle fluid or crusts from smallpox cases.

The value of this laboratory method in the differential diagnosis of smallpox from other virus infections producing skin lesions in man is discussed.

PAPPENHEIMER, A. M., MOLLOY, E., & ROSE, H. M. (1945.) Presence of granules resembling elementary bodies in yolk cells of normal eggs.—*Proc. Soc. exp. Biol., N.Y.* 58. 318-315. 1788

The authors record the presence of minute purplish granules in the yolk cells of developing chick embryos. The granules appear in increasing numbers after 11-12 days of incubation. They cannot be demonstrated before the tenth day. The granules which sometimes occur in diploid forms can be readily demonstrated in sections stained by various methods. They measure up

to $1-2\mu$. It is suggested that these granules represent virus bodies or micro-organisms present as harmless commensals in the yolk cells.—D. L.

Low, R. C. (1946.) *Molluscum contagiosum.* —*Edinb. med. J.* 53. 657-670. 1789

The lesion of molluscum contagiosum in human beings presents a histological picture exactly similar to that of fowl pox and pigeon pox. The epithelial cells are enlarged and contain inclusion bodies, rounded or oval, varying greatly in size from $0.6-1.7\mu$ in diameter. These push aside the nuclei and may distort them to crescentic shapes. However the macroscopic appearance of the lesions is dissimilar and cross-infection is not possible.—R. MACGREGOR.

I. BURNET, F. M., MCCREA, J. F., & STONE, J. D. (1946.) Modification of human red cells by virus action. I. The receptor gradient for virus action in human red cells.—*Brit. J. exp. Path.* 27. 228-236. 1790

II. BURNET, F. M., & ANDERSON, S. G. (1946.) Modification of human red cells by virus action. II. Agglutination of modified human red cells by sera from cases on infectious mononucleosis.—*Ibid.* 27. 236-244. 1791

III. BURNET, F. M. (1946.) Modification of human red cells by virus action. III. A sensitive test for mumps antibody in human serum by the agglutination of human red cells coated with a virus antigen.—*Ibid.* 27. 244-247. 1792

I. Human group O erythrocytes were treated with various strains of egg propagated influenza, mumps and Newcastle disease viruses. It was found that such treatment by some of the strains interfered with subsequent agglutination of the erythrocytes by other strains. It was possible to arrange the viruses in such a fashion that erythrocytes treated with a given strain would be agglutinated by those following it in the series but not by those preceding it.

Erythrocytes treated with viruses were found to be susceptible to agglutination by the homologous virus antiserum.

II. Human group O erythrocytes treated with Newcastle disease virus were found to be immunologically altered so that they would be agglutinated by either the antiserum for the virus or by sera from most patients recently recovered from infectious mononucleosis.

III. Human group O erythrocytes were treated with mumps virus and were found to be specifically agglutinated by mumps antibody.

—F. D. ASPLIN.

MILLS, K. C., & DOCHEZ, A. R. (1945.) Further observations on red cell agglutinating agent present in lungs of virus-infected mice.—*Proc. Soc. exp. Biol., N.Y.* 60. 141-143. 1793

A red cell agglutinating agent has been demonstrated in heated (75° - $80^{\circ}\text{C}.$ for 10 minutes) lung suspensions of mice infected with a pneumonitis virus. Mouse and hamster erythrocytes were susceptible to agglutination by this agent. Human group O, fowl, g. pig, rat, cotton rat, sheep, dog, cat, ferret were not agglutinated.

The agent was absorbed from active extracts by mouse red cells and extracts of fresh normal mouse lung.

Sera of mice, hamsters, and rabbits immunized with live virus or haemagglutinating mouse lung extracts developed a capacity to inhibit red cell agglutination with active extracts.

The agglutinating agent was purified by precipitation with ammonium sulphate.—F. D. A. LOWELL, F. C., & BUCKINGHAM, M. (1948.) **A comparison of the effect of various salt concen-**

See also absts. 1810 and 1811 (fowl paralysis); 1863 (neurotropic viruses); 1865 (avian lymphomatosis).

IMMUNITY

TOMCSIK, J. (1945.) Die Rolle der Bakterienkapsel bei der Infektion und Immunität. [The role of the bacterial capsule in infection and immunity.]—*Schweiz. med. Wschr.*, **75.** 25—

See also absts. 1737 (surface phagocytosis); 1741 (tuberculin); 1749 (brucella mucoid phases); 1764 (avian malaria); 1774, 1775 and 1777 (rinderpest); 1780 and 1781 (distemper); 1784 (fowl pox); 1785 (laryngotracheitis); 1786 (interference phenomenon); 1790-1794 (haemagglutination).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

MATSSON, G., OSSIANNILSSON, F., & RUBARTH, S. (1944.) Knott (*Simulium*) som sjukdomssak hos våra husdjur. [*Simulium* as cause of disease in domestic animals.]—*Skand. Vet-Tidskr.* **34.** 603-629. [English and German summaries.] **1796**

A severe plague of *Simulium equinum* appeared in a small area south-west of Stockholm during an eight-day period in May, 1944, and 28 cattle and one colt died from the effects of the attacks, whilst 38 further cattle were affected but recovered. Human beings were also attacked.

The symptoms comprised localized skin punctures and shock; lactating cows ceased to produce milk and three pregnant ones aborted. There was no fever, but the pulse was rapid and there was marked congestion and oedema of the ventral part of the neck.

The P.M. findings included petechiae from "fly-bites" of the skin with subcutaneous oedema, which was also generalized, sub-epi- and endocardial haemorrhages, waxy degeneration of the myocardium and firmly clotted blood. In cases which did not die from the acute effects, treatment with stimulants and potassium iodide was of value.

trations on the agglutination of red cells by influenza A virus and antibody.—*J. Immunol.* **58.** 229-235. **1794**

No visible agglutination of red cells by influenza virus occurred when the mixture was suspended in 5% glucose solution and the salt concentration was 0.03 Mol. NaCl or less. At a concentration of 0.003 Mol. NaCl union of virus and red cells was inhibited. Virus adsorbed on red cells was eluted when the electrolyte was removed by washing in a salt-free solution. Salt concentration as high as 0.583 Mol. failed to cause inhibition of agglutination of red cells by virus.

High salt concentrations had a much more marked inhibitory effect and low salt concentration a less marked inhibitory effect on the agglutination of red cells by specific antibody.—F. D. ASPLIN.

29. **1795**

A conventional discussion on the subject based on the literature.—A. G. WARREN.

Biological points relating to the insect are discussed.—J. E.

McDUFFIE, W. C., LINDQUIST, A. W., & MADDEN, A. H. (1946.) Control of fly larvae in simulated pit latrines and in carcasses.—*J. econ. Ent.* **39.** 743-749. **1797**

A layer of fly rearing medium (oat hulls, alfalfa meal, etc.) placed at the bottoms of soil pits, to each of which were added about 1,000 house-fly larvae, simulated maggot infested pit latrines. 10.20 g. *p*-dichlorobenzene or 15-25 ml. *o*-dichlorobenzene per sq. ft. gave good kill of larvae in the pits. Smaller dosages were effective if followed by re-treatment in 2-4 days. Both the above substances proved to be good ovicides, since about 5 g. of either substance per sq. ft. completely prevented hatching of house-fly eggs. 5% D.D.T. in fuel oil was inferior as a larvicide, but gave sufficient residual effect to kill many emerging adult flies.

Exposed dog-carcasses were used for tests against carcass larvae, and the best treatments used were sprays of the following (at 1 U.S. pint [16 fl. oz.] per carcass):—*o*-dichlorobenzene; acetylene tetrachloride; water dilutions from 1:4 to 1:9 of an emulsion consisting of 20%

benzene hexachloride, 68% benzene, and 12% Triton X-100 (emulsifier).—L. DAVIES.

DU TOIT, R., & KLUGE, E. B. (1947.) The tsetse fly problem and its control in South Africa.—*Vet. Rec.* 59. 569-574. 1798

General methods of control include those designed to affect adversely the environment of the fly, notably bush clearing. This may prove extremely expensive in maintenance although often successful with *G. palpalis* which has rigid environmental requirements. Game destruction has had success in Southern Rhodesia but is not satisfactory with all species of tsetse fly since some can maintain themselves on smaller animal species. The use of fly traps and the use of certain insecticides are other possible methods of controlling *Glossina*.

In Zululand there are four primary foci of tsetse flies. The Umfolozi Game Reserve harbours *G. pallidipes*; the Hluhluwe Game Reserve *G. pallidipes* and *G. brevipalpis*; the Mkuzi Game Reserve *G. pallidipes* and *G. austeni* and in the Nduma Reserve on the Mozambique border is *G. brevipalpis*. Of these *G. pallidipes* is of primary importance as it infests typical savanna bush with a very wide range, is an efficient predator and is adapted to feeding on small as well as large species of game animals. "Fly" control by extermination of all animals serving as food hosts is impracticable if only because of the policy of game preservation adopted in the Union. Use of the Harris tsetse fly trap for a number of years in Zululand has given a useful index of numbers but has not served to control the tsetse fly.

In view of the success obtained during the war in the control of malaria-mosquitoes by the spraying of D.D.T. from aircraft, this method of insect destruction was tried in the Mkuzi Game Reserve, where the predominant species was *G. pallidipes* which was found to be highly susceptible to D.D.T.

Suitable types of aircraft and the methods used to deliver a uniform and highly atomized spray are considered. After preliminary trials using 5% of D.D.T. dissolved in toluene and containing 10% of a heavy mineral oil with saponified pine resin as the emulsifying agent, 5% solution of D.D.T. in furnace oil and paraffin was substituted. Three applications were made over a period of five weeks, allowing two weeks between the first and second and three weeks between the second and third applications. It was considered that the tsetse fly population was markedly reduced after successive sprayings and that it did not return to its original density at least for several months after completion of the trial. The evaluation of the results attained by the three sprays was difficult because there is no reliable

means of determining the density of the fly population, although the area had been under observation with a large number of Harris fly traps for a number of years.

In general it was concluded that D.D.T. dispersion in atomized form from aircraft is satisfactory in areas not too extensive and where infiltration from adjoining untreated areas can be excluded. Limitations on this method of tsetse fly control are imposed by the density of the foliage, the necessity for fine atomization requiring very low flying and hence producing a narrow swathe, and the necessity for carrying out the spraying cross-wind as flying into or down the wind greatly reduces the swathe width.

[“Bombs” containing D.D.T. were used as a supplement in places where, owing to the land conformation or the nature of the bush, the swathe from the aeroplane failed to provide sufficient cover.]

Trials of the aerosol (smoke dispersion) method of spreading D.D.T. over bush areas have given encouraging results. The methods adopted and the necessary modifications to the aircraft are described. The D.D.T. solution finally used, which was fed directly into the exhaust manifolds, consisted of 20% of the technical product (or 16% of pure D.D.T.) in four parts of toluene and seven parts fuel oil.—S. BRIAN KENDALL.

HUMPHREYS, F. A. (1947.) Some observations regarding tick and insect-borne infections in Western Canada.—*Canad. J. comp. Med.* 11. 187-192. 1799

During the past eight years, some 28,000 ground squirrels, 18,000 rats, and 95,000 ectoparasites, mostly fleas, from the four western provinces were examined. No evidence of plague was found in the rats but virulent plague organisms were recovered from six ground squirrel specimens and 34 flea specimens from South-Eastern Alberta and the adjoining territory in Saskatchewan. The danger is perhaps not great if the infection is confined to ground squirrels, but if rats become established in the area a difficult plague problem may arise. A fair number of cases of Rocky Mountain spotted fever have been reported in Alberta, a few in British Columbia, and at least one or two in Saskatchewan. It is caused by *Rickettsia rickettsi* and the vector in the West is the wood tick (*Dermacentor andersoni*). The tick paralysis question remains unsettled. It is induced only by female ticks. In tularemia, the tick is probably the vector. Cats and dogs are susceptible, sheep are also susceptible but more resistant.—R. GWATKIN.

BOW, M. R., & BROWN, J. H. (1945.) Tick-borne diseases of man in Alberta.—*Canad. med. Ass. J.* 53. 459-464. 1800

In the spring of 1938, the Alberta Rocky Mountain Spotted Fever Survey was inaugurated. During the period 1938-1943 inclusive, the Rocky Mountain spotted fever tick, *Dermacentor andersoni*, was found to be well established in the south-eastern part of the province. Ticks infected with the spotted fever organism, *Dermacentroxenus rickettsi* [*Rickettsia rickettsi*], were collected at Manyberries and Lethbridge. *Pasteurella tularensis* was demonstrated in 16 collections of ticks made in the same area. Protective measures against spotted fever through personal care and vaccination were instituted in the Manyberries area, but no attempt was made to control the increase of mammals and ticks infected with these rickettsia or to prevent their extension into new areas.

Cases of tick paralysis in man, sheep and cattle following tick bite have occurred in areas heavily infested with ticks. During the period of study two cases of tick paralysis in man and two in sheep were reported in Alberta. Four human cases of paralysis in southern Saskatchewan, three of which were fatal, were also thought to be tick paralysis.

Tularaemia has been found in the native
See also absts. 1769 (chicken mites); 1869 (tsetse fly repellents); 1870 (blow-fly repellents); 1871 (mange).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

MCLEAN, A. (1947.) Carcase examination for *Cysticercus bovis* infection. Positive findings at Belfast abattoir.—*Vet. Rec.* 59. 517. 1801

The occurrence of *Cysticercus bovis* in six carcasses out of 2,000 examined is reported. In all cases infection was limited to a single cyst in the centre of the left masseter muscle.—D. LUKE.

TÖTTERMAN, G. (1944.) On the Price-Jones' curve in tape-worm anemia.—*Acta med. scand.* 117. 135-144. [In English. Author's summary copied verbatim.] 1802

The results of the examination of the Price-Jones' curve in 15 cases of tape-worm anemia were as follows :

There was no correlation between the size of the mean diameter and the size of the standard deviation. Neither could a correlation between the size of the mean diameter and the red cell count be stated. On the other hand there was a close agreement between the red cell count and the size of the standard deviation, as the standard deviation was largest in the cases where the red cell counts were the lowest.

These results agree exactly with the results that Mogensen and Price-Jones obtained in cryptogenetic pernicious anemia. In 4 cases of tape-worm anemia the curves were clearly asymmetrical and could be divided into one left

fauna in various districts in Alberta. Rabbits, particularly jackrabbits and cottontails, appear to be the chief source of infection in man. The tick is next in importance as a vector, both by bite and by infection from excreta. Tularaemia-infected ticks have been found in southern, central and northern Alberta. Three species are involved, *Dermacentor andersoni*, *Haemaphysalis leporis-palustris*, the rabbit tick, and *Haemaphysalis cinnabarina*, the bird tick. Two cases of tick-borne tularaemia in man are described. The fact that two proved cases of tularaemia in sheep have been located in tick-infested areas indicates that tick-transmitted tularaemia may be of importance in this disease in sheep and it may account for many of the deaths that occur in sheep during the tick season.

In conclusion the authors state that tick-borne diseases of man and animals constitute a problem of considerable importance in Alberta, and that although the diseases concerned seemed at the time of reporting to be confined to the southern part of the province, there were indications that other areas might also be involved.

—C. E. RICE.

and one main component as in cryptogenetic pernicious anemia (Mogensen). In 3 further cases, which have fairly symmetrical distribution curves, there is reason to believe that behind the abnormally great deviation is hidden not only a left component but a right component as well. The remaining eight curves are practically symmetrical but the increased mean diameter and standard deviation cause them to differ from the normal curve.

The distribution curve in severe tape-worm anemia shows traits which are characteristic of cryptogenetic pernicious anemia.

TÖTTERMAN, G. (1944.) Furthermore on the question of the pathogenesis of pernicious tape-worm anemia. A preliminary report.—*Acta med. scand.* 118. 422-429. [In English. Author's summary copied verbatim.] 1803

An alcohol-extract of broad tape-worm administered parentally in constant doses caused, in two persons who had suffered from pernicious tape-worm anemia, a clear decline in the blood picture which improved spontaneously only when the preparation was left off. Some local and general symptoms were observed as well. A control person did not show any changes, 2 others a passing decline in the blood picture which improved, however, though the preparation was

continued. According to the author, these results support the conception, expressed previously, that an increased sensitivity to tape-worm poison plays an important rôle in the pathogenesis of tape-worm anemia.

SCOTT, J. A., & CROSS, J. B. (1946.) **A laboratory infection of the rat with filarial worms.** —*Amer. J. trop. Med.* **26.** 849-855. **1804**

The authors record infection under controlled conditions of the white rat and the cotton rat with *Litomosoides carinnii*, a filarial worm of the cotton rat.

Sixteen uninfected cotton rats and one white rat were placed in units with infected cotton rats

See also absts. **1755** (lungworms in cattle); **1872** (liver flukes).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

NORRIS, R. F. (1947.) **Pulmonary adenomatosis resembling jagziekte in the guinea pig.** —*Arch. Path.* **43.** 553-558. [Author's summary copied verbatim.] **1805**

Pulmonary adenomatosis involving one lung of a guinea pig is described. The lesions resemble those of jagziekte occurring in sheep. Although the guinea pig was originally inoculated with the pleural fluid of a patient convalescing from lobar pneumonia, there is no evidence that the patient suffered from a similar disease.

STEINER, P. E., STANGER, D. W., & BOLYARD, M. N. (1947.) **A search for carcinogenic substances in carcinomatous human lungs.** —*Arch. Path.* **43.** 590-601. [Authors' summary copied verbatim.] **1806**

The nonsaponifiable lipid extracts of 106 human lungs were tested for carcinogenic activity in 62 separate experiments in which 474 mice of C 57 Black and our albino strains were used. The lungs were those containing primary carcinoma; noncancerous lungs contralateral to those containing primary carcinoma; lungs of persons free from cancers; lungs of persons with cancer primary elsewhere in the body, and lungs of still-born infants.

Six sarcomas were induced at sites of injection of four different extracts. This constitutes a 33.3 per cent yield if the yield is calculated on the basis of the number of mice living when the first tumor appeared in each of the experiments with active extracts. The percentage yield calculated on the basis of the number of tumors in six months survivors was 18.8. In addition, the incidence of lymphatic tumors in C 57 Black mice was probably increased above normal.

The sarcomagenic extracts were derived, respectively, from a non-tumorous lung opposite a lung with primary carcinoma, the noncancerous

and several grass nests of cotton rats were placed in the containers as a source of the arthropod vector, care being taken to exclude crawling and flying insects. All became infected except one of the cotton rats.

The only biting arthropods found in the units were fleas, *Rhopalopsyllus gwynni* and mites, *Atricholaelaps* and *Lyponyssus bacoti*. Numerous dissections of the two former species failed to reveal any developing larvae. *L. bacoti* were found in insufficient numbers to enable definite conclusions to be drawn, but the authors are inclined to incriminate this species as a possible vector.—D. LUKE.

lungs of a person with carcinoma of the prostate, the lungs of a person with rapidly progressing hypertension, and the pooled lungs of stillborn infants.

The sarcoma-inducing activity of an extract of lungs of infants who had not inhaled air indicates that the sarcomagen is probably endogenous. Human lung may be added to liver and spleen as examples of tissues from which extracts with tumor-inducing activity have been obtained.

SPIEGEL-ADOLF, M., & SANO, M. E. (1947.) **Ultraspectrophotometric studies of extracts of normal and of tumor tissue of human origin.** —*Arch. Path.* **44.** 307-313. [Authors' summary copied verbatim.] **1807**

Ultraspectrophotometric studies of extracts of normal and of tumor tissue of human origin were made with the following results: Tissues from carcinoma and lymphosarcoma gave practically uniformly selective absorption peaks at 2,600 angstrom units. Extracts from inflammatory lymph nodes had their maximum of selective absorption at 2,500 units, while normal liver and endometrium had their height of absorption at 2,650 units.

KIRBY, A. H. M., & PEACOCK, P. R. (1947.) **The induction of liver tumours by 4-aminoazobenzene and its N:N-dimethyl derivative in rats on a restricted diet.** —*J. Path. Bact.* **59.** 1-18. [Authors' summary slightly amended.] **1808**

4-Aminoazobenzene has been shown to be carcinogenic for the liver of the Wistar rat when given orally at a level of 0.2 per cent, or more in a diet, R.D.1 [restricted diet containing:—casein, 12%; potatoes (boiled), 76%; salt (Glaxo LD6), 4%; arachis oil, 5%; cod-liver oil, 1%; yeast (D.C.L., dried), 2%] favourable to the production of liver tumours by azo-dyes in this strain of rat.

The carcinogenic action of this azo-dye was found to be much less than that of its N : N-dimethyl derivative, which was given at a lower level in the same basal diet, R.D.1, to rats of the same strain. The basal diet used, R.D.1, was found to be more favourable to liver-tumour induction by N : N-dimethyl-4-aminoazobenzene than was another basal diet, R.D.3, which approximated more closely to that devised by Miller et al. (1941) and found by them to favour greatly liver-tumour induction by this azo-dye in Sprague-Dawley rats.

4-Aminoazobenzene caused little cirrhosis and few tumours of bile-duct origin; the N : N-dimethyl derivative caused considerable cirrhosis, and the bile-duct tumours exceeded those of liver-cell origin. Rats given the free base also developed greatly enlarged spleens; in those given the methylated base the spleen was not significantly enlarged. Primary tumours were not found in organs other than the liver. Metastases were found from liver tumours due to 4-aminoazobenzene as well as from those due to the dimethyl derivative. The presence of methyl groups on the amino group of 4-aminoazobenzene does not appear to be essential for carcinogenesis, but this action is greatly enhanced by such methylation.

The classification of induced hepatic tumours is discussed and their diversity emphasised.

GREENWOOD, A. W., & PEACOCK, P. R. (1945.) The influence of genetic factors on the transmissibility of fowl sarcomas.—*Brit. J. exp. Path.* 26. 857-861.

1809

A statistical examination of the results of transplantation of two chemically induced fowl sarcomas in four inbred lines of Brown Leghorn chickens demonstrated consistent differences in susceptibility.

NUTRITIONAL AND METABOLIC DISORDERS

HEGSTED, D. M., KENT, V., TSONGAS, A. G., & STARE, F. J. (1947.) A comparison of the nutritive value of the proteins in mixed diets for dogs, rats, and human beings.—*J. Lab. clin. Med.* 32. 403-409. [Authors' conclusions copied verbatim.]

1812

Human subjects, rats, and dogs have been used to determine the biologic value of proteins in natural diets. The rat appeared to react in an exactly comparable manner to the human being when meat was added to the diet. Digestibility was not improved but the biologic value was increased 10 per cent. With the dog, on the other hand, both digestibility and biologic value were improved by meat supplementation.

The rat in these studies appeared more comparable to the human being than the dog.

A sarcoma derived from a Brown Leghorn was more easily grown in Brown Leghorn stock than a tumour derived from barred Plymouth Rock.

There was a definite seasonal variation in the transmissibility of both tumours.—F. D. ASPLIN.

DURANT, A. J., & McDouGLE, H. C. (1947.) New symptoms of fowl paralysis artificially produced by blood transfusion.—*J. Amer. vet. med. Ass.* 111. 507-508. Discussion p. 508.

1810

The authors state that soiling of the feathers of the anterior part of the neck and crop and wilted combs are frequent symptoms of fowl paralysis.

—F. D. ASPLIN.

HARRISS, S. T., JOHNSTON, J. W., & MITCHELL, S. G. A. (1947.) A study of isolation in fowl paralysis (lymphomatosis).—*Vet. J.* 103. 301-313.

1811

Two groups of chickens, one hatched from eggs laid by a flock which had suffered very few losses from fowl paralysis, the other hatched from eggs laid by fowls which showed symptoms of fowl paralysis or were closely related to fowls which had died of fowl paralysis, were divided. Part of each group was maintained under conditions of isolation for 11 months, the remainder were exposed to contact with paralysed fowls.

The incidence of lymphomatosis in both the isolated and non-isolated chickens hatched from non-lymphomatous parent stock was significantly higher than in the corresponding groups of chickens hatched from lymphomatous parents.

It is concluded that healthy birds may be raised from eggs laid by an infected flock provided the chickens are maintained under efficient isolation conditions.—F. D. ASPLIN.

Young growing rats, either by paired or ad libitum feeding, appear to classify these proteins in a similar manner to adult rats.

CALLOW, E. H. (1947.) Comparative studies of meat. I. The chemical composition of fatty and muscular tissue in relation to growth and fattening.—*J. agric. Sci.* 37. 118-129.

1813

In analyses of the carcasses of 31 cattle, 29 lambs, and 29 pigs, the animals varying widely in breed, age and plane of nutrition, the water content of fat-free muscle was approximately 78% for each species. Variations within species tended to be large.

Boneless meat, freed from fat, whether English or American, and whether beef, veal, pork, or lamb, contained 77% water, on which basis a series of linear equations is built up to correlate

the percentages of fat, water, and dry fat-free residue in boneless meat. The general equation, calories per 100 g. boneless meat

$$= 82.8 + 8.172 \times \text{the percentage of fat}$$

is thus derived.

With increasing age and fattening, an increasingly large proportion of the extra fat produced is laid down in the fatty, as compared with the muscular, tissue of beef animals and sheep. Furthermore, the amount of fat in the subcutaneous fatty tissue increases more rapidly than that in the intermuscular fatty tissue. Although the elaboration of scientific systems of grading is deferred for a subsequent paper, it is suggested that such systems should be of a dual nature if they are to be of use in the selective breeding of meat animals.—J. T. ABRAMS.

BRAUDE, R. (1947.) The effect of feeding iodinated casein to pigs.—*J. agric. Sci.* 37. 45-50. 1814

B. investigated the effect of iodinated casein as a supplement in the diet of young growing pigs on a basic diet of wheat 47, barley meal 20, flaked maize 20, dried grass 3, and white fish meal 10 parts by weight.

Daily feeding of amounts of and above 1 g. of iodinated casein had a detrimental effect in that there was excessive stimulation of metabolic activity. The effect of a dose of 0.5 g. or 0.25 g. daily was indefinite. B. concludes that there is no practical advantage to be obtained by the feeding of iodinated casein.—J. A. J. VENN.

I. BETHKE, R. M., RECORD, P. R., KENNARD, D. C., & CHAMBERLIN, V. D. (1946.) The relation of nutrition to production and hatchability of chicken eggs. I. Effect of protein supplements and alfalfa meal.—*Poult. Sci.* 25. 570-578. 1815

II. BETHKE, R. M., KENNARD, D. C., & CHAMBERLIN, V. D. (1946.) The relation of nutrition to production and hatchability of chicken eggs. II. Effects of choline chloride, methionine, and certain animal and marine products.—*Poult. Sci.* 25. 579-583. 1816

III. BETHKE, R. M., KENNARD, D. C., & CHAMBERLIN, V. D. (1947.) The relation of nutrition to production and hatchability of chicken eggs.

III. Effect of pantothenic acid, nicotinic acid, pyridoxine, folic acid, biotin, and certain marine products.—*Poult. Sci.* 26. 377-380. 1817

I. The authors studied the effect of different protein supplements and other ingredients on the hatchability of hen eggs, using White Leghorn pullets and yearling White Leghorn hens. A ration in which soya bean oil meal served as the only source of supplemental protein was satisfactory for egg production, but was deficient in a

factor (or factors) essential for good hatchability. Meat scraps (5.0%), menhaden [*Brevortia tyrannis*], a fish common in Atlantic waters, off the U.S. coasts] fish meal (4.0%) in combination with dried fermentation solubles containing 250 µg. riboflavin per g. were the best sources of this factor and when given there was improved or better sustained hatchability. Dried skim milk (5.0%) was less effective; commercial casein and dehydrated alfalfa meal were the least effective supplements.

II. The authors studied the effect of increasing the amount of meat scraps and the influence of choline and methionine on hatchability of hen eggs, using yearling White Leghorn hens. A ration of yellow maize, oats, wheat by-products, dehydrated alfalfa meal, soya bean oil meal, containing minerals and adequate vitamins A, D and riboflavin, was deficient in factors necessary for good hatchability. Choline chloride and dl. methionine when fed alone or in combination did not improve the hatchability. Dried pig's liver, liver extract and condensed fish solubles [see III] were richer sources of the essential factor than meat scraps. When 2.5% of meat scraps were added to the basal ration, the hatchability could not be maintained over an extended period of the experiment.

III. Supplements of pantothenic acid, nicotinic acid, folic acid and biotin to a basal ration consisting of yellow maize 43%, ground oats 20%, wheat by-products 15%, dehydrated alfalfa meal 2.5%, soya bean oil meal 15%, mineral matter and adequate vitamins A, D and riboflavin, were compared with the effect of sardine fish meal and condensed fish solubles [nature not given—presumably liquid from cooked fish]. The basal ration without supplements was deficient in a factor essential for good hatchability, that of fertile eggs being 55.4-68.5%. The addition of the marine products increased the hatchability to 83.9-85.1%. The supplementation with a mixture of the above mentioned vitamins of the B complex did not result in improved hatchability. It is concluded that none of these vitamins was the factor lacking in the basal ration and supplied by the marine products.—E. KODICEK.

MILLER, L. L., ROBSCHEIT-ROBBINS, F. S., & WHIPPLE, G. H. (1947.) Anemia and hypoproteinemia. Weight maintenance effected by food proteins but not by mixtures of pure amino acids.—*J. exp. Med.* 85. 267-275. [Authors' summary slightly amended.] 1818

Dogs with sustained anemia and hypoproteinemia due to bleeding and a continuing low protein or protein-free diet with abundant iron are used to test the value of food proteins as contrasted with mixtures of pure amino acids.

The stimulus of double depletion (anaemia and hypoproteinaemia) drives the body to use every source of protein and all protein-building materials with the utmost conservation. Raiding of body tissue protein to produce plasma protein and haemoglobin is a factor when protein-building factors are supplied in small amounts.

In this severe test (double depletion) the good food proteins in adequate amounts are able to maintain body weight, a strongly positive nitrogen balance, and produce considerable amounts of new haemoglobin and plasma protein. Casein, lactalbumin, whole egg protein, liver protein are all adequate in amounts of 150 to 250 gm. protein per week.

Under comparable conditions mixtures of pure amino acids (essential for growth) do produce large amounts of new haemoglobin and plasma protein and a positive nitrogen balance but do not maintain body weight. The loss of weight is conspicuous even with large amounts of amino acids (200 to 300 gm. protein equivalent per week).

Methionine, threonine, and phenylalanine are related to nitrogen conservation in growth mixtures of essential amino acids but when these three are given together they have little influence on the doubly depleted dog.

Some unidentified substance or compound present in certain proteins but absent in mixtures of the essential amino acids may be responsible for these differences in the response of the doubly depleted dog.

MORRIONE, T. G. (1947.) Quantitative study of collagen content in experimental cirrhosis.—*J. exp. Med.* 85. 217-225. [Author's summary copied verbatim.]

1819

Quantitative determinations of collagen were carried out on rat livers showing cirrhosis due to *p*-dimethylaminoazobenzene and carbon tetrachloride.

A twofold increase in collagen content occurred in cirrhosis due to *p*-dimethylaminoazobenzene. The average total hepatic collagen as well as the per cent collagen content were doubled. The collagen content after 1½ months of normal diet had fallen to normal levels.

In cirrhosis due to carbon tetrachloride, the collagen content underwent about a fourfold increase. Partial reversal with significant decrease in collagen content occurred after stopping the carbon tetrachloride. The incomplete resorption of collagen in this group can be attributed to impaired hepatic regeneration following the prolonged administration of the compound.

The chemical values for collagen parallel the quantitative evaluations of collagen content, based on microscopic examination of liver section stained for reticulum.

Deposition of collagen in hepatic cirrhosis is not necessarily an irreversible phenomenon.

HARBAUGH, F. G., & DENNIS, J. (1947.) The blood potassium and calcium levels of cattle grazing wheat.—*Amer. J. vet. Res.* 8. 396-399.

1820

In an attempt to relate wheat poisoning in cattle in Texas to the inorganic constituents of the blood, the serum calcium and plasma potassium levels were determined of normal dairy cattle, of cattle which had been grazing wheat, unsupplemented, for over two months, and of cattle having tetanic symptoms as the result of such feeding. In the three groups the average blood K/Ca ratios were 1.53, 2.00 and 3.04 respectively.

By oral administration of potassium chloride so that, with normal serum calcium levels, the ratio reached about 3.35, symptoms of wildness and tetany could be induced in cattle.

Calcium-glucose therapy in one animal with wild behaviour restored it to normal.—J. T. A. ALLCROFT, W. M. (1947.) The fate of calcium and magnesium in the blood stream of the ruminant, with special reference to treatment of metabolic disorders in the bovine.—*Vet. J.* 103. 157-176.

1821

Injection of 50% magnesium sulphate into goats at levels of 1.875 g. and 3.0 g. respectively per kg. body weight produced a slight fall in the serum calcium content but sharp temporary rises in the blood sugar and serum magnesium, although subcutaneous injection produced slower, less marked, but more prolonged changes than did intravenous. For goats and cows the anaesthetic and lethal serum magnesium levels were found to be approximately 14 mg. and 20 mg. % respectively.

Evipan [N-methyl-cyclo-hexenyl barbituric acid] anaesthesia produced in goats no hyperglycaemia. Adrenalin-induced hyperglycaemia did not significantly affect serum calcium or magnesium levels, nor did prolactin [pituitary hormone] injection in goats, rabbits or heifers produce any marked effect of that kind.

Intravenous injection of magnesium or calcium either together, as in Sjollema's therapeutic treatment for milk fever and grass tetany, or singly in the same quantity (7.33 g. Ca and 1.8 g. Mg per 1,000 lb. live weight) gave no reciprocal serum calcium/magnesium relationship such as was produced by massive doses.

It is suggested that the maximum quantity of magnesium sulphate which may be safely injected intravenously into a 1,000 lb. cow is 75g.

The serum magnesium levels of cows were not affected by a single dose of 200 g. of magnesium sulphate given orally, nor by seven such consecutive daily doses of 90 g.

In seasonally hypomagnesaemic, but otherwise healthy cows, given magnesium sulphate intravenously or subcutaneously, there was only a temporary (24 hr.) elevation of serum magnesium. On the other hand, four cows, which had staggering fits or lactation tetany, returned to normal condition following injections of magnesium, and their serum magnesium levels were raised rapidly and apparently permanently.

It is suggested that the clinical type of hypomagnesaemia develops rapidly, and therefore the value of a single serum magnesium determination for diagnostic purposes is questionable.—J. T. A.

SHEPPARD, C. W., WELLS, E. B., HAHN, P. F., & GOODELL, J. P. B. (1947.) Studies of the distribution of intravenously administered colloidal sols of manganese dioxide and gold in human beings and dogs using radioactive isotopes.—*J. Lab. clin. Med.* 32. 274-286. [Authors' summary copied verbatim.] 1822

A study of the relative distribution of colloidal particles of manganese dioxide containing radioactive Mn⁵² has shown that in the human being liver concentration is high. The concentration of the pancreas and kidney is intermediate and that of the spleen and other organs is low. Two dogs showed a similar picture for liver, pancreas, spleen and heart, which were the only organs studied. Studies in human subjects and dogs of the distribution of colloidal gold containing radioactive Au¹⁹⁸ showed a high concentration in liver and spleen, intermediate to low in the kidney, and a low concentration in other organs. The difference in the splenic concentration of gold and manganese is striking and suggests a fundamental difference of phagocytic activity for the two substances. The high pancreatic concentration of manganese is of especial significance.

GRÜNINGEN, F. v., KELLER, K., & PULVER, H. (1947.) Beobachtungen und Untersuchungen über eine Mangelkrankheit bei Jungrindern. [A deficiency disease of calves.]—*Schweiz. Arch. Tierheilk.* 89. 286-305. 1823

A deficiency disease was observed in 45 calves 9-18 months of age. The symptoms were ; decrease in appetite, rough coat, emaciation and deficient growth.

Lengthening of the milk-feeding period generally did not effect an improvement of the condition. P.M. examinations for intestinal parasites were negative. Administration of calcium and phosphate preparations and of vitamin D were also without result. The blood tests gave normal calcium and phosphorus levels.

The haemoglobin values were found to be subnormal, ranging between 25% and 54% (controls : av. 68.6%). The blood levels for iron

were considerably low in the affected animals. Addition of iron in the form of ferrous chloride to the food led to a notable improvement in food intake and general condition, after a period of about 10-20 days. The dosage was 300-400 mg. Fe per day. Phosphate was administered in the cases where improvement with iron was noticed.

This treatment led to an increase in the iron content of both the total blood and serum. The iron content of the blood serum was determined by a method of Vanotti & Delachaux (1942), who differentiate between four different fractions of iron, according to solubility.

In twin calves the more affected one was treated with daily doses of 3 g. of a mixture of ferrous chloride, dicalcium phosphate, calcium carbonate and sodium chloride ; 0.15% copper in the form of copper sulphate was added. A favourable therapeutic effect was observed by comparison with the control twin calf.

Six heifers and one young bull, all affected animals, improved when put on a diet of silage.

It is suggested that silage which has been processed by lactic acid fermentation, may contain the *Lactobacillus casei* growth promoting factor and haemoglobin forming factor, folic acid.—P. S.

ENDER, F., & HELGEBOSTAD, A. (1945.) Rettelser til februarheftet. "Om påvisning av en vitamin B₁-destruerende faktor i prøver av sild og brisling. Antivitaminer som årsak til beriberi hos rev". [Corrigenda for the February number—No. 2. p. 32. "Antivitamins as the cause of beri-beri in foxes."]—*Norsk. VetTidskr.* 57. 102. 1824

This is a rather considerable list of corrigenda to the article by these authors [see *V. B.* 16. 272], the chief item being that vitamin H' appeared in the original as vitamin H.—R. PETER JONES.

BRANION, H. D., MOTZOK, I., SLINGER, S. J., & PETTIT, J. H. (1947.) The effect of wheat germ oil in poultry rations. Review of literature.—*Sci. Agric.* 27. 545-564. 1825

Feeding experiments were carried out to study the effect of, or necessity for, wheat germ oil in poultry rations in relation to growth, mortality, egg production, fertility and hatchability.

Pressed or extracted wheat germ oil, when added to ordinary rations, had no beneficial effect on the growth, development or mortality of young chickens to 24 weeks of age, nor on sexual maturity as judged by the onset of egg production. The inclusion of these same materials in ordinary laying mashes had no effect on egg production, hatchability or fertility. Furthermore, the oral administration of various amounts of extracted wheat germ oil to birds from the 10th-24th week of age had no effect on growth and development nor

on the onset of sexual maturity. The continued oral administration had no effect on egg production.—J. D. BLAXLAND.

MCBARRON, E. J. (1947.) The occurrence of ketosis in dairy cattle on pasture.—*Aust. vet. J.* 23. 829-831.

1826

Five cases of illness in pasture-fed dairy cows were observed which resembled the digestive type of acetonaemia. All occurred within five weeks of calving and not more than 1% of any herd was affected. The duration of the disease was from 7-14 days but return to full milk sometimes occupied a month or more. Symptoms were capricious appetite, loss of condition and almost complete agalactia, ruminal atony, and hard dry faeces. Staggering and partial blindness with remissions occurred in most cases. Details of three cases are given in which positive tests for ketones were obtained from urine and blood.

See also abst. 1939 (text-book on hormones and vitamins).

DISEASES,

WIRTH, D. (1947.) Die Leukopenie. [Leucopenia.]—*Wien. tierärztl. Mschr.* 34. 149-153.

1828

W. discusses the diseases of domestic animals in which leucopenia occurs. In general it is quite common in virus diseases, whilst the opposite effect (leucocytosis) occurs in bacterial infections. Leucopenia occurs in acute swine fever, foot and mouth disease, fowl pox, infectious enteritis of cats, contagious pustular stomatitis, equine infectious anaemia, bovine contagious pleuro-pneumonia, and equine infectious bronchitis. Other diseases in which leucopenia has been reported are also referred to.—J. E.

MAUNDER, J. C. J. (1947.) St. George disease of cattle.—*Aust. vet. J.* 23. 158-157.

1829

Noted first on properties carrying wire-grass (*Aristida* spp.) on light soils, this disease of cattle has now been observed on better classes of country throughout Queensland. No information is available on the aetiology of the condition. It is characterised by profuse, foetid, dark diarrhoea, extensive oedema of the head, neck and brisket, a course of 2-6 weeks, a morbidity of 1-100% and a mortality rate of 0.5%. The interference with cattle raising in the affected area is of considerable economic importance. All ages and types of cattle may be affected and most cases occur after some months on dry coarse feed in the winter and a dry spring and summer.—P.M. findings include subcutaneous oedema, hydrothorax, atelectasis, pale flabby myocardium, severe liver damage and extreme pallor of the mucous membrane and walls of the alimentary tract.

Attempts at control have included moving

Treatment with daily doses of molasses and yeast was successful.—D. C. BLOOD.

HITCHINGS, G. H., & FALCO, E. A. (1946.) Effects of whole-wheat and white bread diets on susceptibility of mice to pneumococcal infection.—*Science.* 104. 568-569.

1827

Mice which had been maintained for six days, before the injection of pneumococci, on a diet of white bread proved more resistant than those which had been given whole wheat bread.

Because of this, and of the stimulation of the growth of pneumococci *in vitro* by extracts of certain "crude" foodstuffs, the authors suggest that the unknown dietary factors in such foods may in some cases be more beneficial to parasitic organisms than to the animal consuming the foods: this is in contrast to the usual assumption that a crude foodstuff is to be preferred to a refined one.—J. T. ABRAMS.

GENERAL

affected animals to heavier country usually with immediate improvement and ultimate recovery. Supplementary feeding with licks containing bone meal, salt and iron sulphate or meat meal has been of value on some properties. Therapeutic dosing with iron, copper and cobalt preparations had been largely impracticable because of the wildness of the cattle and the death of some animals due to the exertion and driving.—D. C. BLOOD.

COLLINS, F. V. (1947.) Flank bruising of lambs. A characteristic condition involving the *musculus transversus abdominis*.—*Aust. vet. J.* 23. 140-143.

1830

Occasionally lesions are found on the inner surface of the lateral abdominal walls of lambs during routine meat inspection and their removal considerably damages the carcass. The injury is confined to the transverse abdominal muscle and its aponeurosis and may be on one or both sides. Extravasation of fluid, which may be blood-stained, into the area surrounding a rupture of muscle or aponeurotic fibres, gives the appearance of a bruise. It is suggested that the lesions occur after violent muscular contractions but that some animals are predisposed to such injury by congenital defects in the continuity of the aponeurosis.—D. C. BLOOD.

STEEL, J. D., & WYKE, B. D. (1947.) Cortical scar formation, with focal seizures, following head injury in a dog.—*Aust. vet. J.* 23. 286-292.

1831

Fits began to occur in a greyhound one month after a head injury and recurred at frequent intervals for about four months, and always at

night. In an observed fit the dog was lying on the right side and the head and eyes were turned to the left. Clonic twitching of the jaws and left leg followed, progressing to involve the trunk, then the left hind leg and finally a general clonic convulsion which lasted for about 30 seconds. A tonic convulsion with tightly shut jaws, dilation of pupils and extension of all four legs followed and persisted for about a minute. Gradual relaxation and return to consciousness terminated the attack and the animal was able to stand about ten minutes later. There was a small lump on the right side of the head. Other clinical observations included a slight left fore-limb lameness, alterations in normal reflexes and injuries received during fits.

An irritative lesion of the inferior portion of the right frontal region of the cerebral cortex was diagnosed and craniotomy performed. A subpial clot and an area of necrosis and scar formation in the cerebrum were removed. The dog died four days later from a subdural haematoma.

—D. C. BLOOD.

BLOOD, D. C. (1947.) Suspected congenital atresia of the hepatic bile ducts in a cat.—*Aust. vet. J.* 23. 198-196. [Author's abst.] 1832

Intense jaundice and abdominal swellings were present in a kitten six months of age. Con-

genital atresia of hepatic bile ducts is suggested as the cause of the condition because of the discovery of stenosis of the ducts P.M. and the youth of the cat.

DREOSTI, A. E. (1947.) Lewis "H" factor in post-operative lung complications.—*S. Afr. med. J.* 21. 790-791. [Author's summary slightly amended.] 1833

Post operative lung complications of varying severity are common. There are many factors involved, any of which may play a part in a given case. It is felt, however, that a common factor in all these cases is due to the action of "H" substance [name stated by D. to have been used by LEWIS—a substance similar to histamine and with similar effects]. The origin and action of "H" substance is indicated.

Factors favourable to and antagonistic to the action of "H" substance are mentioned, and a few case reports are added.

The problem is being further investigated, i.e., the determination of histamine-sensitive patients and the incidence of post-operative lung troubles in these individuals.

Benadryl is being used at the moment because of its ease of use and controlled dosage, though the value of adrenalin in oil is not forgotten.

POISONS AND POISONING

WESTON, R. E., & KAREL, L. (1946.) The retained median lethal dose, percentage retention, and respiratory response in unanesthetized, intact rabbits and in unanesthetized, tracheotomized dogs and rabbits exposed to phosgene by the dosimetric method.—*J. Lab. clin. Med.* 31. 1227-1239. 1834

The susceptibility of both dogs and rabbits to phosgene was not significantly affected by by-passing the upper respiratory tract by tracheotomy during exposure, but, in contrast to intact dogs, goats, monkeys and rabbits, none of the "by-passed" rabbits or dogs exhibited any signs of respiratory inhibition or irritation.

The following were the average (median) lethal doses:—for normal rabbits, subjected to artificial respiration, at a concentration of 1.25 mg. per l., 0.2 mg. per kg.; for tracheotomized rabbits, at a concentration of 1.52 mg. per l., 0.25 mg. per kg.; for tracheotomized rabbits allowed to breathe normally, the dose at a concentration of 1.30 mg. per l. was 0.38 mg. per kg.; and for tracheotomized dogs, at a concentration of 1.48 mg. per l. the dose was 1.20 mg. per kg.

Volume of respiration exerted a significant effect on the percentage of phosgene retained after inhalation.—J. LOCHIEL McGIRR.

PULLINGER, B. D. (1947.) Some characters of coagulation necrosis due to mustard gas.—*J. Path. Bact.* 59. 255-259. [Author's summary copied verbatim.] 1835

The local skin lesion caused by liquid mustard gas in mice is coagulation necrosis. It is accompanied by large vascular exudates. Blood circulates through the lesion for a few days after necrosis has occurred and patent lymphatics traverse it. Vascular occlusion occurs after 6-9 days. The dead tissue is then cast off as a slough. The slow progress of the lesion is due to delay in dying and in being cast off. Marginal epithelial healing begins before final separation of the slough.

Collagen and nucleoproteins have been found by Pirie and by Berenblum respectively to combine with liquid mustard gas to form insoluble compounds.

It is suggested that the peculiar property of coagulation necrosis is failure to liquefy or be absorbed and that this failure is due to insolubility of the dead product of tissue and chemical compound.

YOUNG, L. (1947.) Observations on the effects of mustard gas on the rat.—*Canad. J. Res. Sect. E.* 25. 141-151. 1836

Local oedema developed following the application of 5 mg. of mustard gas to the skin of the rat. There was evidence that a change occurred in the permeability of the blood vessels immediately below the exposed surface in less than five minutes after the application. Fluid accumulated for 12–18 hours, it slowly subsided and at 72 hours the water content of the skin was close to normal. The LD 50 was between 9 and 12 mg. per kg. body weight when mustard gas was applied to the skin of the mid-lumbar region. By subcutaneous injection of a 0·2% (wt./vol.) solution in sesame oil the LD 50 was between 1·5 and 1·8 mg. per kg. body weight. The toxicity was similar for male and female rats. Death occurred in a few hours after the cutaneous application of large doses (600 mg. per kg. body weight); the majority of rats that died, following the application of 60 mg. per kg. body weight, did so in 72–120 hours. In these animals, anorexia, progressive loss of weight, distension of the stomach with fluid, congestion of the intestine and severe diarrhoea occurred. Similar changes were seen after lethal amounts up to 6 mg. per kg. body weight were given subcutaneously and most of the animals died in 72–120 hours. Sublethal doses of mustard gas rarely produced diarrhoea and any fall in food and water intake and loss of weight that occurred were slight and of short duration.—P. J. G. PLUMMER.

BREIREM, K. (1943.) Prøveføring med ricinus-holdig linfrømel. [Trials with linseed meal containing castor seeds].—*Norsk Landbruk.* 9. 242–244. 1837

In tests carried out on a consignment of linseed meal in Sweden it was found to be adulterated with 0·12% castor seeds. The linseed meal, in the proportions of 30% or 50% was mixed with oats and maize and fed to two groups of pigs respectively, so that each pig received 1·6 kg. of the linseed meal, oats and maize mixture to 4 kg. boiled potatoes per day for 55 days. While on this diet the pigs had poor appetite, especially those in the second group at the start, became apathetic but later improved. Their weight increases were satisfactory.

Two milch cows were fed on basic rations of hay, straw and cellulose with 0·5 kg. of the linseed meal each per day the first week, herring

meal and bran being substituted during the second week. The third and fourth weeks 1 kg. linseed meal was given, herring meal and bran being again substituted the fifth week. The cows remained well.

Of two calves, three months old, given a ration containing the linseed meal, one would not take the meal to begin with and the other had gastric disturbance. From the second week the calves took 0·1 kg. per day without difficulty and after two weeks this was increased to 0·5 kg. They remained healthy.

Four rabbits, three months old, were given a diet of hay, potatoes and oats and maize with 30% of the linseed meal. The same mixture as that mentioned for pigs was also tried. To begin with, the rabbits had little appetite for the fodder but later they took it well. After a few days two of them became sick, refused to eat, and were apathetic, almost giddy, and extremely thirsty. Both died after a couple of days. The other two remained well, with no signs of poisoning.

It was concluded that the gradual accustoming of the calves and cows may have given them a partial resistance, which would explain the good results.

B. recommends the use of the adulterated linseed meal in a proportion of 10–20% of oats and maize mixtures so that the amount of castor seed will be so small as to obviate risk of poisoning.

—F. E. W.

HUBBS, J. C. (1947.) Belladonna [*Solanum* poisoning in pigs.—*Vet. Med.* 42. 428–429. 1838

This is an account of three outbreaks of poisoning by *Solanum nigrum* [not by belladonna as in title] in pigs at pasture.—J. A. J. VENN.

WILD, H. (1947.) The Eastern Districts Senecio problem.—*Rhod. agric. J.* 44. 164–171. 1839

The most widespread species of senecio has been identified as *S. sceleratus*. Measures which have been used to control the spread are discussed.

Of chemical weed-killers only sodium chlorate is of any value but the cost of application is high. Frequent mowing during the growing season is suggested as a worth while method. Further study of systems of veld management is required for the solution of the problem.—M. C.

PHARMACOLOGY AND THERAPEUTICS

IONOV, P. S. (1944.) Vliyanie karbokholina na zheludochno-kishechnyyi trakt loshadi. [Effect of carbocholine [lentin] on the gastro-intestinal tract in horses].—*Veterinariya, Moscow.* No. 4. pp. 84–87. 1840

Carbocholine, which is said to be identical with lentin, was administered experimentally to

37 horses and two dogs, in doses varying from 1 to 7 ml. of a 1 : 5,000 dilution, and 1 to 4 ml. of a 1 : 1,000 dilution, both given subcutaneously. The reactions of 11 horses to various doses are tabulated, observations being recorded on the occurrence of salivation, lacrimation, nasal discharge, restlessness, defaecation, increase of

peristalsis in the small and large intestine, the acid and ammonia content of the faeces, the time of the reaction and the period of its persistence. Records were also made, by means of a sound, connected with a recording bladder on the muscular reaction of the stomach.

It is concluded that carbocholine stimulates the parasympathetic nerve terminals and plain muscle and increases secretions and the muscular contractions of the gastro-intestinal tract. The drug acts strongly on the parasympathetic and more weakly on the sympathetic. It is suggested that the therapeutic dose should be 4-7 ml. (1 : 5,000) or 1-2 ml. (1 : 1,000) and that these doses should be used in cases of atony of the gastro-intestinal tract, but that there is some danger of rupture when mechanical stoppage or impaction is involved.—U. F. RICHARDSON.

NOBLE, R. L. (1945.) Methods of assaying motion sickness preventives on dogs.—*Canad. J. Res. Sect. E.* 23. 226-234. 1841

The dogs were classified according to their susceptibility to motion. During a period of over three years, animals with an initial moderate or marked susceptibility showed little variation in the response to swinging or to treatment. Dogs of low susceptibility may change and become adapted to motion and be effectively treated by reduced repeated dosage. The drug used as a standard was V-12 ethyl- β -methylallylthiobarbituric acid. Complete protection followed oral doses ranging from 1.25-30 mg. per kg. and no untoward side effects occurred. The dose required depended upon the susceptibility of the animal. Comparative assays with two other barbiturates were made.

Reducing the degree of swinging by one-half allowed the dogs to be effectively treated by one-fourth of the former dosage. The relative difference in potency between the standard V-12 and two other barbiturates included in the study was reduced by the change in magnitude of the swing. Thus, the size and amplitude of the swing has a marked influence on quantitative assays. Individual susceptibility to motion is also a factor in obtaining comparable results.—P. J. G. PLUMMER.

MCINTOSH, J., & SELBIE, F. R. (1946.) Further observations on the chemotherapy of experimental gas gangrene: flavazole, marfanil, V187 and V335.—*Brit. J. exp. Path.* 27. 46-54. 1842

Using mice as test animals and strains of *Clostridium welchii*, *Cl. septicum* and *Cl. oedematiens* as test organisms the authors assessed the value of the drugs on a "survival-days" basis.

The gas gangrene infections differ greatly in their sensitivity to chemotherapeutic agents and

no single compound may be regarded as adequate. For efficiency a mixture is, therefore, advocated.

Against *Cl. welchii* the most active compounds are penicillin and V335 (*p*-methylsulphonylbenzylamine HCl), against *Cl. septicum*, flavazole (proflavine-sulphathiazole) and against *Cl. oedematiens* infection, the sulphone V187 (*p*-methylsulphonylbenzamidine HCl).—MALCOLM WOODBINE.

FULLER, A. T. (1947.) Antibacterial action of some aromatic amines, amidines, amidoximes, guanidines and diguanides.—*Biochem. J.* 41. 403-408. 1843

The bacteriostatic activities of a series of derivatives of aromatic amines, amidines, amidoximes, guanidines and diguanides are recorded against *Streptococcus pyogenes*, in broth and in blood and *Staphylococcus aureus*, *Clostridium welchii*, *Bacterium coli* and *Proteus vulgaris* in broth. They were found in all cases to be low.

Substitution of groups within the molecule generally leads to a lowering of activity but a methyl, ethyl, methoxyl, ethoxyl or sulphonamide group in the *para* position enhances streptococcal inhibition.—MALCOLM WOODBINE.

LEVINE, M., & THOMAS, A. R., Jr. (1947.) Some laboratory observations on antibiotics.—*Bull. U.S. Army med. Dep.* 7. 922-938. 1844

Simple procedures are described for determining the resistance of bacteria to penicillin by a serial dilution method and for determining the potency of penicillin on solid media by using a platinum loop, with the penicillin solution, applied to the surface instead of the more usual cup method.

Penicillin in the culture media, is reasonably stable at 5°-8°C. and it is particularly effective against actively growing organisms. Very much higher concentrations are required to lyse old cultures. Strains of *Staphylococcus aureus* and *Clostridium welchii* resistant to penicillin have been developed and of *Bacterium coli* to streptomycin.—MALCOLM WOODBINE.

ANON. (1947.) Present position of penicillin.—*Lancet.* 253. 483-484. 1845

In spite of rising penicillin production, hospitals complained of a shortage during 1947, a state of affairs accentuated by a 40% export quota. The more expensive, white, crystalline penicillin need only be used for intrathecal, ventricular or subconjunctival administration. Kept dry—penicillin's useful life will exceed the expiry date; in solution refrigeration is necessary. It is destroyed by acids, alkalies, metals (zinc, lead, copper, aluminium), primary alcohols, hydrogen peroxide and potassium permanganate, and long boiling (stable at 60°-70°C. for some minutes). Penicillin should only be used in infections by

sensitive organisms and sufficient should be administered by the most apposite method. All equipment must be kept sterile. Three lists of organisms are given (a) those susceptible, (b) those affected by and (c) those unaffected by penicillin. Many pharmacists are now licensed to dispense sterile aqueous injection and oil-wax suspensions of penicillin and their services should be utilized to save hospital staff's time.—MALCOLM WOODBINE.

REYNOLDS, B. A. (1947.) Penicillin in the treatment of mastitis in dairy cows. A preliminary report.—*Aust. vet. J.* 23. 212-215. [Discussion pages 216-217.] 1846

Five infusions, each of 20,000 units of calcium penicillin in 200 ml. of sterile distilled water, administered after five successive milkings cured 23 of 24 quarters affected with streptococcal mastitis and 14 of 25 quarters affected with staphylococcal mastitis. To achieve this result two quarters infected with streptococci and one with staphylococci received two series of infusions and one infected with staphylococci received three. The criterion of cure was negative culture ten days after the last infusion.—D. C. BLOOD.

MURNANE, D., BAZELEY, P. L., & OXER, D. T. (1947.) Penicillin treatment of mastitis. [Correspondence.]—*Aust. vet. J.* 23. 230. 1847

The authors criticize the use of hypodermic syringes as being a source of infection, unless sterilized after each injection, for the infusion of penicillin in water into the udder, and the administration of one dose of 100,000 units of penicillin in lieu of three doses of 25,000 units at 24-hour intervals. They also point out that penicillin is more efficient and less irritant as an udder infusion than sulphanilamide.—D. C. BLOOD.

THORP, W. T. S., UHRIK, I. J., & STRALEY, E. J. (1947.) Concentrations of penicillin in the bovine mammary gland following infusion and the penicillin tolerance of certain streptococci.—*Amer. J. vet. Res.* 8. 157-165. 1848

Forty-five cows were infused in all quarters with five dosage levels of penicillin in three different amounts of diluent. By two hourly penicillin assays it was found that the stage of lactation and extent of induration materially affect the penicillin level obtaining at eight hours after infusion. Of the three diluent levels of 20, 50 and 100 ml., the 100 ml. quantity gave the least variation in penicillin assay. When infused immediately after the last milking of the lactation period, penicillin remained for 48 hours in all quarters and for 72 hours in 75% of the quarters. The infusion of penicillin solution caused no greater reduction in milk production or increase in leucocytes than the infusion of physiological saline in the same amount.

The concentration of penicillin at eight hours for doses of 100,000 and 200,000 units did not justify the higher dosage.

Enterococci (Lancefield D, *Str. uberis* type) were resistant to 200 units per ml. of penicillin while *Str. agalactiae* (Lancefield B) and *Str. dysgalactiae* (Lancefield C) would not tolerate more than 1 unit per ml.—MALCOLM WOODBINE.

BISWAL, G. (1947.) Bovine mastitis in Orissa.—*Indian vet. J.* 24. 179-182. 1849

This is a very short account of observations on a small dairy herd consisting of 13 cows and eight buffalo cows. Clinical cases were treated by intramammary infusion with 1 : 5,000 acriflavin solution. The organism responsible was *Strept. agalactiae*.—M. C.

BARNES, J. M. (1947.) Penicillin and *B. Anthracis*.—*J. Path. Bact.* 59. 113-125. [Author's summary copied verbatim.] 1850

Penicillin in sufficient doses, if given early enough, will prolong and sometimes save the lives of rabbits and mice experimentally infected with anthrax.

The drug is more effective against vegetative than against spore infections; surprisingly large doses must be given very early in the infection.

Difficulty in controlling infection appears to depend on three factors: (1) production of penicillinase by *B. anthracis*; (2) persistence of spores in the tissues and their germination after the blood-penicillin level has fallen; and (3) poor natural resistance of rabbits and mice to anthrax infection.

NUTINI, L. G., & LYNCH, E. M. (1946.) Comparative action of an extract of brain tissue and penicillin on *Staphylococcus aureus* infections.—*J. Bact.* 52. 681-684. [Authors' summary copied verbatim.] 1851

It is apparent from the evidence presented that there is in brain tissue a factor that functions effectively against *Staphylococcus aureus* *in vivo*. Whether the extract is used as a prophylactic or therapeutic measure, it is superior to penicillin in the dosages used for *Staphylococcus aureus* infections in these experiments.

BUNNELL, D. E., HUTCHINGS, L. M., & DONHAM, C. R. (1947.) Effects of penicillin on *Brucella suis* *in vitro* and *in vivo*.—*Amer. J. vet. Res.* 8. 367-373. 1852

Inhibition was observed when massive inoculations were made into bacto-tryptose agar to which had been added 6.25 units of penicillin per ml. of media, though strain variations occurred. With smaller inoculations of similar media marked inhibition occurred at a concentration of 0.625 unit of penicillin per ml. of media and there were also strain variations. Penicillin treatment of g. pigs infected with *Br. suis* was not effective. Adminis-

tration of penicillin to g. pigs apparently resulted in the death of 36% of 185 animals during treatment regardless of the size of the daily dose of penicillin within the range of 800 to 3,200 units.

—S. J. GILBERT.

VIRIDÉN, P. (1945.) Undersökningar rörande terpentinoljans baktericida effekt gentemot *Brucella abortus*. [Bactericidal action of turpentine on *Brucella abortus*.]—*Skand. Vet Tidskr.* 35. 143-148. [English summary.] 1853

The author found by culture experiments that vaporized turpentine had great antibiotic effect on *Brucella abortus*.

Rabbits were artificially infected with *Br. abortus* and a group of them was treated daily with 0.5 g. turpentine each *per os* for three days. Ten days after infection the agglutination titre of the blood reached its maximum, 1/2,000; the titre began to fall between the tenth and fifteenth day after infection, in the group treated. The animals were observed for 42 days, after which the agglutination titres in the treated group had fallen to 1/200, while in the control animals they varied between 1/1,000 and 1/2,000.

The author concluded that turpentine had a certain effect on *Br. abortus* both *in vitro* and *in vivo*.—F. E. W.

MORGAN, W. T. J., & SYNGE, R. L. M. (1945.) An anti-gramicidin immune rabbit serum.—*Brit. J. exp. Path.* 26. 287-293. 1854

Gramicidin itself or after adsorption on charcoal was ineffective as an antigen, but when conjugated with a protein, a satisfactory specific antiserum was produced. Intravenous injections of gramicidin are toxic to rabbits and this toxicity was only slightly diminished when rabbits were used which had been immunized with gramicidin plus protein and which possessed serum precipitins.

The antibacterial and haemolytic activity of gramicidin was not significantly diminished when combinations of the antibiotic with its serum antibody were tested.—K. S. TOWERS.

ORNSTEIN, O., & THORSSON, K. G. (1944.) Untersuchungen über die keimtötende Wirkung ein- und mehrbasiger Alkohole. [Bactericidal action of simple and polybasic alcohols.]—*Acta path. microbiol. scand.* 21. 914-927. [In German.] 1855

TWORT et al. [see also *V. B.* 11. 322, 643; 13. 71 and 17. 344] found that sprays of phenols dissolved in propylene glycol were effective in killing germs in air. They concluded that the most suitable chemicals were those which were water soluble and not too volatile, thus giving a certain stability to the droplets in air, after nebulization.

The authors tested the bactericidal action of pure ethyl, propyl, butyl and amyl alcohol, and of 1, 2-propylene glycol, *in vitro* as liquids and in a special chamber as aerosols, using staphylococci as test organisms.

In vitro, the comparative bactericidal activities of the pure concentrated solutions were as follows:—butyl alcohol > propyl alcohol > amyl alcohol > propylene-glycol > ethyl alcohol. Those experiments, however, in which the bacteria-carrying air (by spray) in the test chamber was exposed to aerosols of the alcohols, led to the following unexpected sequence of bactericidal efficiency:—propylene glycol > amyl alcohol > butyl alcohol > propyl alcohol. This sequence is in concordance with the boiling points of these alcohols, propylene glycol having the highest. The efficiency of such aerosols increases with the boiling point or decreases with rising volatility. The lower the volatility, the higher is the concentration in the aerosol-droplets which condense around the air-borne bacteria.

It is also assumed that these effects are influenced by the temperature, pressure and humidity of the air. From comparisons with control experiments it was found that a considerable part of the glycol action was due to a physical precipitation of the organisms from the air by falling droplets, and that later the organisms gradually died within these droplets on the floor or other surfaces of the test chamber.

The authors, therefore, doubt whether it will be possible to obtain sufficient air-sterilizing effects with the above aerosols.—P. SASSE.

I. ALEXANDER, H. E., & LEIDY, G. (1947.) Mode of action of streptomycin on type b *H. influenzae*. I. Origin of resistant organisms.—*J. exp. Med.* 85. 329-338. [Authors' conclusions copied verbatim.] 1856

II. ALEXANDER, H. E., & LEIDY, G. (1947.) Mode of action of streptomycin on type b *Hemophilus influenzae*. II. Nature of resistant variants.—*Ibid.* 85. 607-621. [Authors' summary copied verbatim.] 1857

I. Of fourteen patients with type b *H. influenzae* infections treated with streptomycin alone ten recovered promptly; in three of the four remaining cases failure was proved to be due to emergence of resistance of the organisms to streptomycin. The rapid development of resistance to 1000 units of streptomycin per cc. during treatment argues against metabolic adaptation of the bacteria. Careful study of large samples of initial bacterial populations shows resistant members in all ten strains examined. The incidence varies from 1 in 1.1 billion to 1 in 18.8 billion organisms.

The proportion of resistant members is not

significantly higher, before treatment, in patients who do poorly than in those who respond promptly. The results indicate that emergence of resistance is the result of a selective process; after elimination of sensitive members the very few resistant ones, apparently present in all strains, make up most or all of the population in the cultures taken after commencement of treatment.

The survival of organisms which can grow in high concentrations of streptomycin, either in patients or *in vitro*, is influenced more by the size of the bacterial population than by any other known factor. Since the bacterial population is relatively small in those patients with mild or moderately severe infections the likelihood of a significant number of very resistant members being present is remote.

The traits responsible for resistance of the organisms are apparently inherited: (a) The resistant state of one strain has been transmitted *in vitro* without change in degree through over one hundred subcultures in the absence of streptomycin. (b) Persistence of resistant organisms in the nasopharynx of one patient during a one year period raises an important public health problem.

II. In all of ten strains of *H. influenzae* examined prior to exposure to streptomycin a very small fraction of the bacteria formed colonies in the presence of 1,000 units of streptomycin per cc. These variant organisms possess the characteristics of bacterial mutants.

Different independent cultures of the same strain on different occasions, and even cultures seeded in a single test with the same inoculum, show marked variation in prevalence of resistant variants in populations of comparable size. This variation is just as great in genetically homogeneous culture sources as in heterogeneous sources. Evidence is presented for the continuous random occurrence of these resistant organisms.

The rate of occurrence of the resistant members is not significantly different for the ten strains studied; it varies from 2.6×10^{-11} to 7.0×10^{-11} per bacterium per bacterial generation. The results of five different tests on the same strain show comparable variation, 2.9×10^{-11} to 5.3×10^{-11} . This low rate contributes evidence consistent with the mutation hypothesis.

Variants exhibiting resistance to 1,000 units of streptomycin per cc. transmit this trait unchanged in degree through many generations. The results obtained after twelve or more subcultures in streptomycin-free media suggest that in a portion of the colonies resistant to streptomycin an additional trait, differing from those exhibited by the parent culture, is associated; the nutritional requirements of these cultures are different.

FELDMAN, W. H., HINSHAW, H. C., & KARLSON, A. G. (1947.) Frequency of administration of streptomycin. Its influence on results of treatment of tuberculosis in guinea pigs.—*Amer. Rev. Tuberc.* 55. 435-443. [Spanish summary.]

1858

The authors record the results obtained with different dosage schedules in 64 g. pigs with extensive TB., which developed following subcutaneous inoculation with 0.1 mg. tubercle bacilli (H 32 Rv). Streptomycin administration at frequent intervals during each day was not essential for successful results; twice daily at 12-hourly intervals appeared adequate. The suppression of the disease was striking and consistent.—MALCOLM WOODBINE.

LEVADITI, C., & HENRY, J. (1947.) Mécanisme d'action antibiotique de la streptomycine à l'égard du *Bacillus subtilis*. [Antibiotic action of streptomycin on *Bacillus subtilis*.]—*Rev. Immunol. Thér. antimicrob.* 11. 32-39. 1859

Concentrations of 10 units per ml. or less of streptomycin cause a latent phase of some four hours after which growth begins and follows that of the controls. Concentrations of 20 units per ml. are lethal at six hours, while one of 50 units per ml. is lethal at one hour. The antibiotic causes a polymorphism in the organism at concentrations above 10 units per ml. The authors suggest that the organism may be used, successfully, as a means of checking streptomycin production.—MALCOLM WOODBINE.

FRANCIS, J. (1947.) Some observations on the pharmacology of the sulphonamides and 4:4'-diamino-diphenyl sulphone in the domestic animals.—*Vet. J.* 103. 193-207. 1860

Observations are recorded on the blood levels of the sulphonamides, administered in various ways and in repeated doses. In calves, initial oral doses of 0.1 g. per kg. followed by half this dose on four subsequent mornings gave a blood level of 5 mg. % for 4:4'-diaminodiphenylsulphone, 4-nitro-4'-aminodiphenylsulphone, sulphamethazine and sulphamerazine; 2-8 mg. % for sulphanilamide, sulphapyridine and sulphadiazine and only 1 mg. % for sulphathiazole. The average faecal level produced by the various drugs was 33 mg. %. In sheep daily oral doses of 0.03 g. per kg. of 4:4'-diaminodiphenylsulphone gave an average blood level of 3 mg. % and 0.1 g. per kg. a level of 6-8 mg. %. Sheep given 0.1 g. per kg. sulphamethazine and sulphanilamide twice daily, gave blood levels of 10 and 15 mg. % respectively.

4:4'-Diaminodiphenylsulphone is exceptional in pigs in that it remained less time in the body than sulphamethazine; doses of 0.1 g. per kg. given subcutaneously of each gave the same

maximum blood level of 11 mg. % but the sulphone was more rapidly excreted and a severe methaemoglobinaemia developed. In horses the sulphone was the drug which remained longest in the body but again a severe methaemoglobinaemia was produced. Doses of 150–200 ml. of a 33·3% solution of sodium sulphamethazine may be given subcutaneously or 0·1 g. per kg. intraperitoneally (half-way between the last rib and the crest of the ileum). Blood levels of 12 mg. % (1 hour) falling to 2 mg. % (24 hours) were obtained and repeated intraperitoneal injections may be given if the solutions are warmed.

Single oral doses of 60 g. of sulphone on three successive days to three cows gave blood levels of 4·2–7·9 mg. % and milk levels of 1·5–2·1 mg. %. Doses of 90 g. sulphanilamide followed by two doses of 30 g. on the same day and three doses of 30 g. on two successive days gave a mean blood level of 6·7–8·4 mg. % and milk levels of 8·5–10·5 mg. %. No toxic effects were noticed with the sulphone but diarrhoea, severe anorexia and a milk yield drop occurred with sulphanilamide. Allowing for the sulphone's greater potency, and that an inflamed udder loses specific excretory power to some extent when the "milk" resembles blood serum—it was possible that the milk level of sulphone in cows with mastitis (*Str. agalactiae* infection) might be higher than in normal cows. Cows on 90 g. sulphanilamide per day gave 4·6 mg. % in the milk (18 samples, 18 animals) and in cows on 60 g. sulphone per day 2·5 mg. % (seven samples, six animals), which corresponds to 8–10 mg. % of sulphanilamide and was achieved with smaller doses.

Injection of drugs into the udder: In lactating cows the low solubility, slow absorption and excretion of sulphone make it the drug of choice—10 g., as a watery suspension, giving much higher milk and blood levels than 25 g. sulphanilamide. 10 g. doses, in liquid paraffin, on injection into quarters which were not milked, gave milk levels of > 10 mg. % for three days. In dry cows the results were irregular but doses of 20 g. per quarter, preferably in liquid paraffin, gave effective milk levels for 3–4 weeks and blood levels for 9–12 days. With doses of 10 g. the milk levels were maintained for 14 days and the blood levels for seven days.—MALCOLM WOODBINE.

NOUVEL, J. (1942.) Quelques applications de la sulfamidothérapie. [Sulphonamide therapy.]—*Cah. Méd. vét.* 12. 52–54. 1861

A brief account of the effect of sulphonamides in treating pneumonia, pleuropneumonia and a "typhus" infection, similar to infectious gastro-enteritis in cats and in animals in a French zoo.

Septazine [benzyl sulphanilamide] and solus-
zeptazine [disodium γ (γ -phenyl-propyl-amino)

benzene-sulphonamido α γ disulphonate] gave inconsistent results but dageñan, or sulphapyridine, was very satisfactory for the treatment of pneumonia and pleuropneumonia in chimpanzees.

Septazine and soluszeptazine were of value in treating the gastro-enteritis in brown bears—but the results were not as satisfactory as those of sulphapyridine against the pneumonias.—M. W.

O'MEARA, R. A. Q., McNALLY, P. A., & NELSON, H. G. (1947.) The intracellular mode of action of the sulphonamide derivatives.—*Lancet.* 253. 747–752. 1862

During the logarithmic phase of growth highly reactive metabolites are produced in the cell and its environment. One of these is the unstable and highly reactive glucoreductone ($\text{CH}_2\text{OH} \cdot \text{CO} \cdot \text{CHO}$) which readily unites with *p*-aminobenzoic acid to form a stable, non-reactive compound which, nevertheless, may again be hydrolysed into its components.

The authors suggest that *p*-aminobenzoic acid acts as a stabilizer for glucoreductone during bacterial metabolism by preventing the loss of an essential intermediate metabolite during growth and safeguarding the cell from toxic effects due to excess. Glucoreductone, however, may be only one type of metabolite so stabilized; since other reactive substances containing a carbonyl group would condense similarly with *p*-aminobenzoic acid.

The sulphonamides, exemplified here by sulphathiazole and sulphapyridine, also condense readily with glucoreductone but the compounds so formed are less soluble and not so readily hydrolysed. The condensation product with sulphanilamide is, however, more soluble. Thus, the increased chemotherapeutic activity of the sulphonamides and their lower susceptibility to the inhibition caused by *p*-aminobenzoic acid parallels the greater stability of their glucoreductone compounds. The condensation product of sulphanilamide can be utilized for an energy source, those of sulphapyridine and sulphathiazole cannot so be utilized.—MALCOLM WOODBINE.

BAZZICALUPO, C. (1942.) Trattamento sulfapyridinico di affezioni da virus neurotropo nei roditori. [Sulphapyridine treatment of neurotropic virus infections of rodents.]—*G. Batt. Imm.* 29. 554–557. [English, French & German summaries, abst. from English summary.] 1863

B. describes an epidemic of fatal illness in laboratory animals caused by a filtrable virus recalling that of poliomyelitis and inducing nervous symptoms, said to be comparable with a paralysis of rodents described by French workers [no traceable reference given].

After sulphapyridine injections (0.2 g. of a 20% solution) in one or two doses for five days, and after an interval of three days for a further five days, the animals recovered and the disease did not spread to in-contacts.—K. J. SINCLAIR.

MOORE, E. N. (1946.) The efficacy of recently developed sulfonamides against fowl typhoid.—*Poult. Sci.* 25. 307-311. 1864

Sulphonamide treatments were given to young chickens to determine their value in affording protection against inoculation with *Salmonella gallinarum*. Sulphasuxidine, sulphathalidide, and sulphamerazine were each mixed with the food fed to different batches at concentrations of 0.5 and of 1.0% and two mixtures of sulphonamide compounds [nature of the difference not given] each containing sulphamerazine, sulphathalidide and sodium carbonate were each used in the drinking water of other groups of chicks in concentrations of 0.2-0.4%.

Sulphamerazine and each of the two mixtures were effective in reducing the mortality but only small numbers of experimental chickens were used and there were other variable factors in the experiments. The survivors all gave positive reactions to the tube agglutination test at the conclusion of the experiment but they were retained for further blood-testing to determine whether or not they would remain reactors to the agglutination test.—J. D. BLAXLAND.

BELDING, T. C., & DIBBLE, G. D. (1947.) The influence of sulfamerazine upon the incidence of avian lymphomatosis.—*Amer. J. vet. Res.* 8. 413-415. 1865

Using female pedigree single-comb White Leghorns from stock highly susceptible to avian lymphomatosis and feeding with a chick mash diet containing 0.5% sulphamerazine (1% in the diet was toxic), the development of the disease was not prevented, the incidence being 16.2% (37 birds) in the drug-diet group and 15.2% (46 birds) in the control group.

There was no apparent effect upon egg production and normal shell formation in the sulphamerazine group but the birds were protected from a mild attack of coccidiosis which occurred in the control group. (Both groups were housed in the same room but were separated by a chicken-wire partition.)—MALCOLM WOODBINE.

STABLER, R. M. (1947.) *In vivo* effect of metachloride on chronic trichomoniasis in pigeons.—*J. Parasit.* 33. 358. 1866

Treatment of *Trichomonas gallinae* infections was attempted in view of the good results obtained with metachloride in avian malaria. Six white Carnean pigeons chronically infected with *T.*

gallinae in the upper digestive tract were used: two of these were used as controls and four as test birds. The drug was administered in the drinking water at a concentration of 150 mg. per kg. body weight per day for seven days but no appreciable effects were observed.—C. H. S.

BONFANTE, G. (1946.) Terapia e profilassi della coccidiosi del coniglio con composti acridinici. [Treatment and prophylaxis of rabbit coccidiosis with acridine compounds.]—*Clin. vet., Milano.* 69. 12-20. 1867

B. recommends the use of dialkyldiamino-methoxyacridine given orally or parenterally in the prophylaxis and treatment of coccidiosis in the rabbit. For parenteral injection, the dose is 1-1.5 ml. of 50% solution given on three successive days and repeated after an interval of 15 days. The drug kills the parasite in the schizont stage. B. discusses its mode of action, and also the question of natural immunity to the parasite.

—I. W. JENNINGS.

SMADEL, J. E., & JACKSON, E. B. (1947.) Chloromycetin, an antibiotic with chemotherapeutic activity in experimental rickettsial and viral infections.—*Science.* 106. 418-419. 1868

Experiments are recorded on the action of a new antibiotic chloromycetin isolated from a soil actinomycete on embryonated eggs infected with the Gilliam strain of *R. orientalis*, and on mice infected with the Karp strain of the organism. All the embryos of the group of eggs receiving 1.0 mg. of the drug given by inoculation into the yolk sac, half an hour prior to infection, were alive when the last of the control eggs died. In mice a daily intraperitoneal injection of 1.5 mg. protected all the mice, and the oral administration of 5 mg. a day, starting two days after injection protected seven out of eight mice. Only three mice died out of eight which received 2.5 mg. of the drug on the tenth day after infection, against seven out of eight untreated controls. The results of experiments on embryonated eggs infected with *R. prowazekii*, *R. mooseri*, *D. rickettsi* and two strains of psittacosis were similar to those in which *R. orientalis* was used, but the results were negative for Japanese encephalitis virus in mice, and variola and influenza A virus in eggs.

—U. F. RICHARDSON.

FINDLAY, G. M., HARDWICKE, J., & PHELPS, A. J. (1946.) Tsetse fly repellents.—*Trans. R. Soc. trop. Med. Hyg.* 40. 341-344. 1869

Of nine substances applied to human skin to test their repellent action on *Glossina palpalis* the best results from at least two experiments made on different days, and six separate experiments in

the case of formula 622 were given by indalone (2,2'-dimethyl-2-carbobutoxy-dihydro-7-pyrone) and formula 622, which contained indalone, the first reducing the number of settling tsetse to a third, and the number of flies that bit to a fifth, and the second reducing the number settling to a third, and the number that bit to a seventh. There was a marked decrease in efficiency between four and six hours after application. Both substances were effective up to four hours against the bites of West African *Culicoides*.

Some loss of efficiency occurred when treated subjects were exposed to sunlight, but sweating did not appear to affect the repellent action.

—U. F. RICHARDSON.

LOEFFLER, E. S., & HOSKINS, W. M. (1946.) **Toxicity and repellency of certain organic compounds to larvae of *Lucilia sericata*.** —*J. econ. Ent.* 39. 589-597. 1870

This paper describes a search for larvicides which have both delayed toxicity and repellency to *Lucilia sericata* larvae. Rapid killing of larvae in cases of myiasis is to be avoided, since dead larvae in the wound promote restrike and have to be removed by hand. With a suitable repellent larvicide, larvae would be driven into the surrounding wool and die before restrike could occur. A method devised to test organic compounds both for delayed toxicity and repellency, and simulating conditions met in a myiotic wound, is described. Of 88 compounds tested by this method, diphenylamine, butyl carbitol (diethylene glycol monoethyl ether) chloroacetate, and epichlorohydrin were the best repellent larvicides. A new blowfly repellent, spray A [50% by vol. of a polymerized butylene ("plastol"), 20% by vol. of carbitol acetate and 30% by vol. of dimethylallyl disulphide], developed in America, was found to have considerable larvicidal action to supplement its repellency.—L. DAVIES.

OSBORNE, H. G. (1947.) **Dimethyl phthalate for the treatment of mange in rabbits caused by *Notoedres cati* var. *cuniculi*.** (Gerlach 1857.) —*Aust. vet. J.* 23. 52. 1871

In 60 rabbits treated once each with dimethyl phthalate there were complete cures in 55, relapses in two, and three died before the result could be assessed. The compound was applied liberally to the lesions. There were no ill-effects.

In preliminary trials dimethyl phthalate was very effective in treating ear mange due to *Psoroptes equi* var. *cuniculi*.—H. McL. GORDON.

STAUFFER, V. D., MUGABURU, L. G., & REY DE CASTRO, A. (1947.) **Results of trials with hexachlorethane in the treatment of distomiasis of sheep.** —*N. Amer. Vet.* 28. 437-439. 1872

The authors investigated the effectiveness on 50 aged ewes, all passing fluke eggs and at different stages of pregnancy, some having already lambed, of hexachloroethane alone and mixed with bentonite administered as a compressed bolus in distomiasis in sheep.

A 30 g. dose gave adequate control of the flukes. The addition of bentonite had no additional value.

In a few cases eggs were found in the faeces after treatment and this was considered to be due to the failure of the damaged liver to eliminate sufficient of the drug via the bile ducts.—D. LUKE.

ANON. (1947.) **Treatment of arthritis with salts of copper.** —*Brit. med. J.* 20th Sept. 461. 1873

Following the beneficial results obtained by the use of gold salts, organic salts of bismuth were tried with encouraging results and later an organic compound of copper, cuproallylthioureabenzzoate of sodium was used. The substance contains 19% of copper and a solution containing 0.25 g. Cu in 10 ml. of distilled water was administered intravenously. Treatment began with a dose of 0.1 g. of the salt which was increased gradually to 0.25 g. A total amount varying from 2.5-5 g. constituted a course, the injection being given twice a week.

In 50% of the cases studied there was an arrest of the disease, in a further 30% the results were encouraging and in 20% indifferent. The remedy appears to have an advantage over gold, being equally beneficial and without toxic manifestations. The administration of copper salts is not always free from toxic effects, some inorganic salts cause cirrhosis of the liver which developing slowly may be manifested years later. The treatment therefore requires further investigation.

—J. G. BROTHERSTON.

GORDON, J., MCLEOD, J. W., MAYR-HARTING, A., ORR, J. W., & ZINNEMANN, K. (1947.) **The value of antiseptics as prophylactic applications to recent wounds.** —*J. Hyg., Camb.* 45. 297-306. 1874

The value of various antiseptics was tested by application to superficial wounds in mice heavily infected with a virulent haemolytic streptococcus. The prophylactic treatment of such wounds is justified. Outstanding results were obtained with sulphanilamide powder, proflavine and triphenylmethane dyes (brilliant green and crystal violet). The results with phenolic antiseptics (e.g., lysol, dettol) were not as good. It is suggested that proflavine and a brilliant green-crystal violet mixture, are probably better than sulphanilamide powder as "first aid" application to wounds, in view of their wider range of antiseptic activity. (But this does not take into con-

sideration their relative toxicity.) In wounds involving extensive and deep damage to the tissues and multiple infection including anaerobes, the results were not good with any of the anti-septics investigated. Intramuscular penicillin should be administered in cases where there is extensive injury.—J. M. ROBSON.

ROBERTS, M. H., & RAHN, O. (1946.) The amount of enzyme inactivation at bacteriostatic and bactericidal concentrations of disinfectants.—*J. Bact.* 52. 639-644. [Authors' summary copied verbatim.] 1875

The activity of all the energy-producing enzymes of *Escherichia coli* grown on acetate medium was determined in the presence of growth-retarding, growth-inhibiting, and lethal concentrations of poisons.

Retardation of growth in seven cases out of nine occurred at a concentration of poison that had little or no effect on the energy production. Concentrations that inhibit growth completely do not always inactivate or even retard the enzymes. At lethal concentrations, however, the enzymes are inactivated.

See also absts. 1935 and 1936 (text-books).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

I. HARTRIDGE, H. (1946.) Recent advances in the physiology of vision.—*Brit. med. J.* April 27th. 637-639. 1877

II. HARTRIDGE, H. (1947.) Recent advances in the physiology of vision—Part II.—*Brit. med. J.* June 28th. 913-916. 1878

These two articles review the recent advances in the physiology of vision and are concerned especially with the human eye with special reference to colour vision. The author discusses recent findings, including much of his own work, following the researches of Granit (1943) who showed by means of micro-electrode methods that the retinae of vertebrates have many types of colour receptors. H. shows that the trichromatic theory of colour vision put forward by Thomas Young can now be regarded as obsolete and must be superseded by some form of polychromatic theory as a result of recent work on foveal vision, hue discrimination, micro-stimulation, colour mixture and colour blindness.—F. R. BELL.

PLUM, C. M. (1944.) Some investigations on the content of reticulocyte-ripening substances in various organs.—*Acta med. scand.* 117. 437-447. [In English, author's summary copied verbatim.] 1879

A report is given of the occurrence of fully ripe as well as preformed (tyrosine activable) reticulocyte-ripening substances in various animal organs. Of the fully ripe maturing substances the

After removal of the poisons by dilution or antidotes, the enzyme activity of cells exposed to poisons was again determined. The dilution of a sublethal concentration of phenol resulted in reactivation of the inhibited oxidase. The inhibition of oxidase activity caused by the lethal concentrations of ceepryl (cetyl pyridinium chloride) and mercuric chloride could not be reversed.

Experiments with concentrations between the bacteriostatic and the bactericidal dose of $HgCl_2$ showed that the enzyme mechanism is very nearly as sensitive as the multiplication mechanism.

GUITERAS, A. F., & SHAPIRO, R. L. (1946.) A bactericidal detergent for eating utensils.—*J. Bact.* 52. 635-638. [Authors' summary copied verbatim.] 1876

When cation-active agents are used as bactericides in detergent compositions, it is essential that the detergent be emulsifying but not saponifying. If the alkalinity of the detergent is sufficiently high to saponify fat, the resulting soap will inactivate the cation-active agent and render the solution completely ineffective germicidally.

greatest amount is found in the plasma, liver, spleen and bone-marrow. Preformed (tyrosine activable) reticulocyte-ripening substances are not normally found in the plasma. In the spleen and bone-marrow about 1/3 is tyrosine activable, in liver about 2/3 and in the stomach 4/5-9/10. Of all the organs examined the stomach contains the largest amount of fully ripe + preformed maturing substances, determined on extracts of the various organs, made by extraction of 1 g. dried with 10 cm³ saline.

Considerable amounts of ripening substances were found in the abomasum, i.e. the secretory part of the stomach of ruminants, none in the non-secretory parts of the stomach.

In pig's stomach the largest amount of fully ripe maturing substance was found in the pylorus : by division of the stomach wall the greater part was found corresponding to the tunica mucosa, while the proportion of fully ripe and preformed substance was fairly similar throughout the stomach.

In the fasting gastric juice of normal human subjects but little fully ripe maturing substance was found, but a considerable activation occurred upon the addition of tyrosine.

These results are interpreted to mean that the preformed ripening substances are formed in the stomach and in some way or other are carried to the reticulo-endothelial system where they are

linked by tyrosine to the fully ripe maturing substances found in the plasma.

GOMORI, G. (1948.) Chemical character of the enterochromaffin cells.—*Arch. Path.* 45. 48–55. [Author's summary copied *verbatim*.] 1880

Contrary to previous ideas, the typical histochemical reactions of the enterochromaffin cells are due to the presence of a derivative of resorcinol. The presence of pteridine cannot be demonstrated in them with histochemical methods now available; they do not contain deoxyribose.

I. WALLGREN, I. (1946.) On the pale granular substance of the cell and the structure of the living mass. Report I. The cytoplasm. *Acta Path. microbiol. scand.* 23. 415–485. [In English.] 1881

II. WALLGREN, I. (1946.) On the pale granular substance of the cell and the structure of the living mass. Report II. The nucleus of the cell.—*Ibid.* 23. 436–448. [In English.] 1882

III. WALLGREN, I. (1946.) On the pale granular substance of the cell and the structure of the living mass. Report III. Golgi's apparatus.—*Ibid.* 23. 449–456. [In English.] 1883

[Author's summaries copied *verbatim*.]

I. The finest structures of the cytoplasm have been examined partly in living blood corpuscles, partly in stained cells in films of blood and bone-marrow, and partly in different kinds of tissue cells in paraffin sections.

A description is given of a new kind of non-staining granules, the "pale granules", which have been observed in abundance in all the studied cells. Binding evidence of the incidence of such a granular system is put forward.

The earlier known chromophil granular system has been studied in detail. An interflow has been stated of chromophil drops in the living cell by way of thread-like bridges which arise between two adjacent drops. The communications are but temporary, and are completely broken off again shortly. A permanent cytoreticulum embracing the whole cytoplasm and consisting of a spatial net composed of fine threads between fine dots has no correspondence in the living cell.

The two kinds of granules are intimately intermixed but arranged so as to surround the chromophil drops with one or more pale drops. This double granular system is characteristic in the cytoplasm. In the living cell the two kinds of drops move about and collaborate in a strictly regulated way which is closely described. The cytoplasm is compared with an emulsion in which two different kinds of drops are suspended in a structureless hyaloplasm.

II. A large part of the cell nucleus contains

a basal mass which similarly as the cytoplasm is constructed of a three-phase system, an emulsion, in which two kinds of drops have been suspended in a structureless basal substance. The chromophil drops are evenly distributed and surrounded by pale drops similarly as in the cytoplasm. The basal substance is contractile. The relief of its surface is subjected to characteristic changes and in its inner part shifts occur which correspond to similar motions in the cytoplasm. The consistency of the nucleus is more firm than in the cell body. The chromosomes in cell division prophase, nucleoli, and chromatin lumps are situated in the surface layer of the basal mass and are partly immersed in it.

III. Similarly as in the cytoplasm and in the cell nucleus a double granular system of chromophil and pale drops suspended in a structureless basal substance may be stated also in Golgi's apparatus. When the secretion drops first become visible they are in close adjacency of the chromophyl granules in the system. Later the growing secretion drops are surrounded by several chromophil drops and by pale granules.

The pale substance is subjected to a close study and assumed to be composed of carbohydrate matter. The observations made in this investigation suggest that the pale granular substance is of vital importance as regards the function of the cell.

PIKE, R. M. (1947.) Failure of sodium salicylate to inhibit hyaluronidase *in vitro*.—*Science.* 105. 391. 1884

Guerra, F. (1946.) found that when Indian ink, or Evans blue was injected with hyaluronidase into the skin of rabbits, or human beings, subsequent to sodium salicylate administration, the spreading effect was decreased. P. failed to demonstrate such an effect *in vitro* on testicular or streptococcal hyaluronidase.—M. WOODBINE.

WILSON, P. W., & BURRIS, R. H. (1947.) The mechanism of biological nitrogen fixation.—*Bact. Rev.* 11. 41–73. 1885

This review of recent work deals largely with advances which have been made possible by the application of precise physico-chemical methods to the investigation of the enzyme system involved. While the new knowledge has been mainly gained using *Azotobacter*, sufficient evidence has accumulated to formulate a general scheme of nitrogen fixation.

In the past the role of initial key intermediate compound has been assigned to various compounds of which the two chief rivals have been hydroxylamine and ammonia.

The evidence now obtained by the use of a nitrogen isotope as a tracer definitely favours ammonia as occupying this place. The develop-

ments leading to this work are briefly described and the claims for hydroxylamine and ammonia are examined. The main points in favour of ammonia are that marked nitrogen supplied to *Azotobacter* as N₂ or NH₄⁺ accumulates at first in the same fractions. Ammonia is accepted as a source of nitrogen to the exclusion of the nitrogen fixation reaction as are compounds, such as urea, easily broken down to ammonia. Substances such as nitrates, etc., less readily converted into ammonia, inhibit fixation less readily and they require time for enzyme systems to be developed. *Azotobacter* uses combined nitrogen in few compounds and only those easily converted to ammonia are assimilated at a rate comparable to that of free nitrogen.

In describing the enzyme systems the Michaelis constant, various inhibitions, auxiliary compounds and the roles of hydrogenase and oxygen are discussed with reference to *Azotobacter*. In different organisms there are many similarities but some differences which may assist in solving the mechanism.

The general scheme of fixation is presented diagrammatically and from it the three possible routes are considered. The first scheme suggests reduction of nitrogen by hydrogen and seems most likely. To overcome certain objections the second scheme assumes the hydrogen for reduction to come from a reversal of the Knallgas reaction, while the third method envisages an oxidative mechanism.

Thermodynamically all the proposed schemes appear to satisfy the energy relationships required by *Azotobacter*. The schemes are not generally applicable, for hydrogenase is not found in all systems, e.g., plant nodules, and the source of the hydrogen is then doubtful. There is no reason however for the reducing system to be identical in all cases for in other enzyme systems there may be variation not only in closely related species but even in the same species at different times.

—K. G. TOWERS.

BICHEL, J. (1944.) Studies on the erythrocytes' content of reduced glutathione and its relation to the hematopoiesis.—*Acta med. scand.* 117. 474-487. [In English, author's summary slightly amended.] 1886

As sulphhydryl compounds are supposed to have great influence on the course of the chemical processes in connexion with cell-division, Parker & Kracke interpret the results of their studies on the blood glutathione values in benzene-leukopenic rabbits as indicating that the blood glutathione is a normal accelerative factor for cell division in the bone marrow, because injections of benzene into the animals resulted both in leukopenia and in depletion of the reduced glutathione in the blood;

and they would ascribe to the blood glutathione an important rôle in regulating the granulopoiesis.

The author has checked this work and shows that while in benzene leukopenic rabbits there is doubtless a decrease of reduced glutathione in the blood there is no parallel between this and the number of granulocytes, but rather a parallelism of the glutathione decrease and the erythrocyte values; these two values falling at about the same rate, so that the individual red cell's content of reduced glutathione (glutathione index) remains fairly constant. Similar results were obtained in rabbits that had been made leukopenic by all-over irradiation with roentgen. In experimentally produced leukocytes there is no change in the blood's content of reduced glutathione. In hemorrhagic anemias in rabbits there is at first an immediate fall in the glutathione values, but afterwards a rapid rise, so that the glutathione index for a time is considerably increased. In hemorrhagic anemias in man something similar is the case. Also in pernicious anemia in man there is in the untreated stage increased glutathione index, which under the specific treatment returns to about normal values.

On the basis of these researches and other results from the literature, the author points out that while a relation between the glutathione content of the granulocytes and the activity of the granulopoiesis is not altogether excluded, a number of circumstances point to a connexion between the activity of the erythropoieses and the erythrocytes' content of reduced glutathione. His studies on this subject will be continued, especially with a view to the leukoses, in which the blood's content of reduced glutathione can be very large.

WHIPPLE, G. H., MILLER, L. L., & ROBSCHIEF-ROBBINS, F. S. (1947.) Raiding of body tissue protein to form plasma protein and hemoglobin. What is premortal rise of urinary nitrogen?—*J. exp. Med.* 85. 277-286. [Authors' summary copied *verbatim*.] 1887

Dogs with sustained anemia and hypoproteinemia due to bleeding and a continuing low protein or protein-free diet with abundant iron will continue to produce much new hemoglobin and plasma protein for many weeks.

The stimulus of double depletion (anemia and hypoproteinemia) leads to raiding of body and tissue protein to fill the demand for new hemoglobin and plasma protein. The blood proteins in these experiments take priority over the organ and tissue proteins. This is another illustration of the "ebb and flow" or dynamic equilibrium between organ or tissue protein and blood proteins.

The average dog cannot tolerate this drain of double depletion for more than 7 to 11 weeks and

during this time may lose 30 to 40 per cent of body weight. Some dogs are much more resistant to this raiding than others. Some dogs show a high blood protein output during every week up to the danger point. With the largest blood protein output one usually observes the most rapid weight loss.

For every kilogram of weight loss we observe 50 to 140 gm. blood protein output. The weekly blood protein production ranges from 40 to 66 gm.

These experiments make heavy demands on the body protein and we expected to record a "premortal rise" in urinary nitrogen. No such observations are noted, rather a most frugal use of all protein and minimum figures for urinary nitrogen.

We suspect that "premortal rise" in many experiments means a terminal infection with the related catabolism of tissue protein and high urinary nitrogen.

TURNER, C. W. (1947.) The male hormone content of ruminant manure.—*J. Dairy Sci.* 30. 1-8.

The androgen content of ruminant manure was assayed by feeding it to White Plymouth Rock chicks during a period of 28 days. The average comb weight of chicks fed 10% dried manure from lactating cows was 225.2 mg. in comparison to the comb weight of normal chicks of 61.3 mg. Chicks fed methyl testosterone at the rate of 20 mg. per kg. of food had combs averaging 238.8 mg. The actual source of the hormone in the manure was not determined. The androgen content of the manure of other ruminants including goats and sheep of both sexes was either low or absent (when tested by this method). The manure of dairy bulls contained only small amounts of androgen.—J. M. ROBSON.

BIRD, S., PUGSLEY, L. I., & KLOTZ, M. O. (1947.) The quantitative recovery of synthetic estrogens from tissues of birds (*Gallus domesticus*), the response of the birds' testis, comb and epidermis to estrogen and of humans to ingestion of tissues from treated birds.—*Endocrinology*. 41. 282-294.

The distribution of synthetic oestrogens in the tissues, the rate of excretion, and the effect on male characters were studied in Barred Rock and Leghorn cockerels. Preliminary tests on three cockerels which had received 13.2 mg. of dimethyl ether of hexoestrol per 100 g. of feed for seven days showed that while the muscular tissue possessed little oestrogenic activity, the liver, skin, gizzard and adipose tissue contained relatively large amounts of oestrogen. The highest concentration was in the adipose tissue—5 mg. per 100 g. of fat. High oestrogenic activity was observed in

adipose tissue after feeding the dimethyl ethers of diethylstilboestrol and dienoestrol, but when dienoestrol diacetate was fed or when diethylstilboestrol was injected subcutaneously, the oestrogenic activity of the fat was very slight.

Suppression of maleness (as judged by comb size and testis weight) in cockerels, 10-12 weeks of age, was satisfactorily achieved by administering 3.3 mg. dienoestrol diacetate per 100 g. of ration for 12 days. In cockerels one year of age, however, 20 mg. of the dimethyl ether of diethylstilboestrol per day was not sufficient to give complete suppression.

Oestrogens produced a hypertrophy of the epidermis of the cockerels giving the surface of the carcass a smooth white appearance. This response of the epidermis appears to be a very sensitive measure of oestrogenic activity in cockerels, the secondary sex characters being less responsive to oestrogen. The testes appeared to possess a high degree of resistance to oestrogen therapy.

Controlled quantities of oestrogen-containing tissues from the experimental birds were fed to five women, the daily dose of oestrogen being approximately 2 mg.; as a result, the menopausal vaginal-smear picture was replaced by smears characteristic of oestrogenic activity.—A. COWIE.

BARSANTINI, J. C., & MASSON, G. M. C. (1947.) Effects of steroids on lactation.—*Endocrinology*. 41. 299-307.

The effects of various steroids on lactation were studied in intact and ovariectomized rats, the main criterion used to estimate lactational efficiency being the growth curves of the litters. The steroids were injected in oily solution twice daily (with the exception of the ethynyl-compounds which were in the form of a suspension), commencing on the first day *post partum*.

In intact rats α -oestradiol, in daily doses of 10 μ g., 1 mg. and 10 mg.; testosterone, androstenediol, dehydro-iso-androsterone in daily doses of 10 mg., all caused a marked, or very marked, inhibition of lactation. Androstenedione, methyl androstenediol, methyl androstanediol, ethyl testosterone, ethynyl androstenediol and methyl testosterone, depressed lactation to a lesser degree. Progesterone, acetoxy-pregnenolone, pregnenolone and deoxycorticosterone had no effect on lactation.

The inhibitory action of α -oestradiol, testosterone, androstenedione, androstenediol and dehydro-iso-androsterone was not apparent if the rats were ovariectomized at the commencement of treatment. The action of other steroids was not studied in ovariectomized rats.

0.5 mg. α -oestradiol per day depressed lactation in intact but not in ovariectomized rats even when treatment was not commenced until

the eighth day *post partum* when lactation was fully established.

It is concluded that the inhibitory effect of
See also abst. 1939 (text-book on hormones and vitamins).

the steroids on lactation is mediated through the ovaries and appears to be associated with the luteotropic action of the steroids.—A. T. COWIE.

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

ANON. (1947.) Food values of dairy products as affected by methods of handling in production, distribution, and use. [Report of the Committee on Milk and Dairy Products.]—*Amer. J. publ. Hlth.* 37. 1113–1120. [Summary copied *verbatim.*] 1891

From the foregoing discussion it is evident that it is impossible to generalize on the all-round stability of the nutrients contained in dairy products as they are subjected to the varied conditions which prevail in the handling of the products from production to consumption. However, it is possible to indicate in broad terms the relative stability of specific nutrients. It may be stated, for example, that riboflavin is remarkably stable except when acted on by light; this photochemical reaction is accelerated by heat. Thiamin is somewhat less stable to heat than riboflavin but is not influenced by the light-heat combination. Neither the riboflavin nor the thiamin content of milk is strongly affected by the feed of the cow. The vitamin A value of dairy products, on the other hand, depends to a great extent on the carotene content of the cow's ration; in general, however, it remains stable during ordinary processing and handling of the products.

MARTEL, H. (1946.) L'abattoir moderne les techniques à préconiser. [Techniques to be recommended in the modern abattoir.]—*Cah. Méd. vét.* 15. 77–96. 1892

A survey is given of the excellent methods employed in the large "packing houses" of U.S.A. and Argentina. Various suggestions are put forward to improve the general standard of hygiene in French abattoirs especially the methods of slaughter. Slaughter by instruments that pierce the skull are not recommended as they form point of entry for bacteria to the whole system. The stunning mallet and the electrolethalizer may cause blood splash. M. therefore recommends hanging

See also absts. 1935 and 1936 (text-books on meat and milk inspection).

the fully conscious animal by a hind limb and bleeding into a bucket.—R. MACGREGOR.

MORGAN, M. T. (1947.) Health inspection of imported food stuffs—past and present.—*J. R. Inst. publ. Hlth.* 10. 266–271. 1893

Prior to 1939 when ample shipping space was available, all imported meat came as chilled whole or split carcasses. These could be inspected at the place of import and none but absolutely disease-free carcasses were passed. Present circumstances require jointing, de-boning and hard freezing by the exporting country, and though this saves shipping space it renders inspection at the port of entry impossible. However, the standard of inspection by exporting countries is high and it is unlikely that such a disease as TB. would be overlooked.—R. MACGREGOR.

ANON. (1947.) Recent studies on disinfection of air in military establishments.—*Amer. J. publ. Hlth.* 37. 189–198. 1894

This is a report of a committee of the National Research Council, Washington. Among the methods which have been tried are oiling of floors and bedding to lay dust, ultra-violet irradiation aerosols and glycol vapours. Oiling of floors and bedding is reported to be a cheap, practical and effective measure for reducing dust. None of the other methods are recommended for general use at present as further research is necessary.—M. C.

SHAHAN, M. S. (1946.) A solid foundation for veterinary science.—*Proc. 50th ann. Meet. U.S. Live Stk sanit. Ass., 1946.* pp. 209–212. 1895

S. discusses the requirements for ordered development of veterinary science in the U.S.A.

Research and education are fundamental and there is a great need for improvement in the collection and analysis of statistics on the incidence of disease.—M. C.

REPRODUCTION AND REPRODUCTIVE DISORDERS

BABÍK, J. (1947.) Umělá inseminacia kobyl. [Artificial insemination in mares.]—*Čas. česko-slovensk. Vet.* 2. 31–32. 1896

Thirty-three mares were inseminated with semen collected by the sponge method from three

ejaculates. The semen was diluted with glucose solution (proportions not stated) and 20 ml. were introduced into the uterus in each insemination. Some of the 17 mares which became pregnant had been sterile for several years.—E. PŘIBYL.

SMIRNOV-UGRYUMOV, D. V. (1940.) Iskusstvennoe osemenenie krupnovo rogoatovo skota v kolkhozakh Moskovskoi oblasti s primeneniem transportirovki i khraneniya spermy. [Artificial insemination of cattle on collective farms in Moscow province with transported and preserved semen.]—*Iskusst. Osemen. sel'khoz. Zhivotn.* 1. 125-135. 1897.

The insemination of cows in the Moscow province with transported semen gave satisfactory results as compared with fresh semen, or natural service.

Semen preserved for 10-20 hours gave a fertilizing efficiency of 60%.

The use of a freshly prepared diluent containing glucose and phosphate for the preservation of semen gave satisfactory results. To sterilize the transport receptacles 96% alcohol is preferred to steam.—K. A. ALLEN.

I. NAGORNYI, E. P. (1940.) Osomenenie kobyl zhelatinirovannoj spermoj. [Insemination of mares with gelatinized semen.]—*Iskusst. Osemen. sel'khoz. Zhivotn.* 1. 137-141. 1898.

II. NAGORNYI, E. P., & SMIRNOV, I. V. (1940.) Opty osemenenija korov spermoj v zhelatinovykh kapsulakh. [Insemination of cows with semen in gelatin capsules.]—*Ibid.* 1. 148-151. 1899.

I. This method was tested on mares, having proved successful on sheep and cattle. The simplicity of the use of gelatinized semen makes it unnecessary to use expensive instruments and does not require trained personnel. Twenty mares were inseminated with gelatinized semen, 60 by injection of semen and a third control group was served naturally.

Selection of mares in oestrus was made daily using a vaginal speculum. Only those mares were inseminated which showed hyperaemia of the vulva and excretion of a large amount of clear, thin mucus. The mares were inseminated on the second, fifth, eighth, and eleventh days of oestrus.

The solidified semen was prepared as follows:—a freshly prepared diluent containing glucose and sulphate was used, to this was added 5% gelatin. The mixture was then placed in a water bath at 60-70°C. and filtered through paper while hot. 5-10 ml. of 0.1N NaOH was added to each 100 ml. of filtrate. For the preparation of paraffin tubes, 8-10 layers of paper are wound round a glass tube of 1.5 cm. diameter. The paper tube about 40 cm. in length is taken off the glass tube, dried and immersed for 30-40 minutes in melted paraffin at 100-120°C. The tubes are then left to cool in a vertical position on a wooden rack. After cooling one end is plugged with a waxed cotton wool plug. These tubes are stored in clean sheets of filter paper in a dry place until used.

The semen was diluted with the gelatinized diluent, heated to 24-25°C., in the proportions of 1:2 and 1:5. 40 ml. of the diluted semen were poured into each of the prepared waxed paper tubes, packed into a thermo-insulating layer of lignin and then kept at 10-15°C. for 40-50 min., during which time it solidified.

The diluted, gelatinized semen was used for artificial insemination, about 1½-2 hours after ejaculation, by introducing the tube into the vagina to a depth of about 15-20 cm. and pushing the cylinder of solidified semen out with the aid of a wooden or glass rod, using the waxed cotton plug as the piston. The body temperature soon liquefied the gelatin and the spermatozoa became motile.

By this method a fertilizing efficiency of 45% was obtained and by the injection method 52%, as compared with natural copulation.

II. The diluted (glucose phosphate) semen was added to gelatin and poured into gelatin capsules. The dilution was made in proportion 1:1. The dosage for insemination was approximately 0.5 ml. solidified semen. The capsules were used 10-15 minutes after the mixture had cooled and solidified. The total surface of the capsule except the lid was treated with paraffin before use, to prevent early liquefaction. Each capsule was wrapped into three insulating layers (paper, cotton wool, paper) and packed into a small cardboard box. No cooling devices were used during transport.

The fertilizing efficiency of diluted solidified semen was 68.8% compared with 35% efficiency of undiluted, injected semen. When used during two periods of oestrus the efficiency was raised to 68.8% and that of the control to 37.5%.—K. A. A.

KHRONOPULO, N. P. (1940.) Opty transportirovki spermy barana iz Askaniya-Nova v kolkhozy Rostovskoi oblasti. [Transport of ram semen from Askania Nova to collective farms in Rostov province.]—*Iskusst. Osemen. sel'khoz. Zhivotn.* 1. 118-124. 1900.

This is an investigation of the possibility of long distance transport of ram semen preserved at 0°C. The semen of five rams was used for artificial insemination of sheep on two farms. Each ram gave daily 2-4 ejaculates, each ejaculate being examined for volume, activity, concentration and resistance. One part of the ejaculate was diluted with Na_2HPO_4 (1 ml. of semen with 0.5 ml. of buffer), the other part was diluted 2-4 times with a diluent containing glucose and phosphate. Cooling and transport took place in 1,000 ml. vacuum thermos flasks. Gradual cooling was achieved by wrapping the test tubes in cotton wool and muslin and placing them in the thermos first at 30°C. for 20-30 min. and for the same period at 25°, 20°, 15°, 10°, 5° and 0°C. The

cooling to 0°C. took two and a half to three hours. Several thermos flasks together were packed in boxes and transported by air (1,000 km.). Sometimes transport was prolonged to 24–36 hours. Transit resulted in a 36.2% loss.

602 sheep were inseminated, but only 442 are shown on the register after lambing. Out of these only 85 lambed and bore 103 lambs, 53 male, 50 female. Quite a number of premature births (not recorded) occurred during the cold weather in winter.

Insemination with transported semen took place 24–54 hours after the plane had landed and the percentage of lambing varied accordingly.

Semen used 24–36 hours after landing gave an efficiency of 20.7% \pm 4.8%, 37–54 hours 9.8% \pm 7.8%. The longest period of survival of spermatozoa still giving results was 52 hours after landing.

The extremely low fertilizing efficiency of the transported semen may have been due partly to lack of skill in selecting ewes in heat for insemination.—K. A. ALLEN.

MILOVANOV, V. K. (1940.) Okislitel'no-vosstanovitel'nyi rezhim pri sokhranenii spermatozoidov s.-kh. zhivotnykh vne organizma. [The oxidation-reduction potential of spermatozoa during preservation.]—*Iskusst. Osemey. sel'khoz. Zhivotn.* 1. 180–207. 1901

M. investigated the effect of oxidation-reduction processes on the preservation of semen of bulls, stallions, rams and rabbits. Preserved in an atmosphere of nitrogen the oxidation-reduction potential is $r\text{H}_2$ 9–20 and in open, covered or vaseline-sealed tubes is $r\text{H}_2$ 11–20. In an atmosphere of hydrogen $r\text{H}_2$ falls to 0 but continued aeration raises it to $r\text{H}_2$ 25–30. Samples of the semen of stallions, bulls and rams preserve their motility for a prolonged period in an atmosphere of one of these gases, especially if there is an adequate supply of glucose in the diluent.

Spermatozoa remain motile and viable under anaerobic conditions, the most favourable being when the oxidation-reduction potential $r\text{H}_2$ is 0–10, there is glucose in the diluting medium and excess concentration of H ion is prevented. During the handling of all kinds of semen unnecessary aeration by pouring or foaming should be avoided.—K. A. ALLEN.

NEIMAN, O. F., & ZAL'TSMAN, A. A. (1940.) Perezhivaemost' i skorost' prodvizheniya spermatozoidov v polovykh organakh kobyly. [Viability and motility of spermatozoa in the genital tract of mares.]—*Iskusst. Osemey. sel'khoz. Zhivotn.* 1. 317–329. 1902

Measurements of the sexual organs of mares are given. The dimensions of follicles before and

after ovulation as well as those of the yellow bodies are tabulated.—K. A. A.

BONNIER, G., & HANSSON, A. (1948.) Identical twin genetics in cattle.—*Heredity*. 2. 1–1903

The opinion of Lillie, Keller and other workers that identical twins are of very rare occurrence in cattle has proved to be erroneous.

The value of identical twins in studies to evaluate the relative importance of environmental and genetical factors in determining productivity is discussed.

The authors then describe work done over a period of ten years. The method used in recognizing or diagnosing identical twins and in designing experiments are described. From this work they have evolved the concept of a "ceiling" genetically determined for all kinds of quantitative characters, that is for each cow there is a production maximum above which she cannot rise irrespective of the amount of food consumed. The "ceiling" is characteristic of the genotype. Examples are given of results obtained in experiments. Such experiments make it possible to separate variance into three parts, namely, that due to heredity, that due to environment and that due to interaction between heredity and environment.

—M. C.

LESBOURYRIES, G., & LAGNEAU, F. (1947.) Anomalies du développement de l'oeuf chez les mammifères. [Anomalies of foetal development in mammals.]—*Rec. Méd. vét.* 123. 360–374. 1904

This article does not present anything new to the study of foetal development. The authors describe and illustrate the anomalies of development which occurred in the litter of one bitch and in the litters of two female rabbits where the first foetuses expelled at full term were normal and living, the next were normal but stillborn, and those following showed varying degrees of arrested development. The remainder of the article is concerned with a discussion of the various hypotheses which have been advanced to explain the possible causes of arrested foetal development especially in the multiparous animal.

—F. R. BELL.

DANELIUS, G. (1944.) Hormonbehandling vid ovarialcystor hos nötkreatur. [Hormone therapy of ovarian cysts in cattle.]—*Skand. VetTidskr.* 34. 534–541. [Abst. from English summary.] 1905

D. treated 128 cases of ovarian cysts in cows with luteinizing gonadotrophic hormone, prolan B, giving 600 international units in single or repeated doses while the old routine treatment (rupturing of the cysts and douching) was being carried on.

Results were compared with those obtained in a similar group treated without hormones. In both groups 67% of the cows became pregnant after treatment, normal oestrous cycle being resumed in an average of 1.5 months in each group.

Gonadotropic hormone therapy is therefore not recommended as a general measure, although, it may be of value in certain cases if combined with the usual treatment.—F. E. W.

HANCOCK, J. L. (1947.) Clinical observations on the use of "Luteinising hormone" (Chorionic gonadotrophin) in the treatment of ovarian cysts in the bovine.—*Vet. Rec.* 59. 639-641. 1906

The hormone was injected intravenously into 12 cows and heifers in doses of 800 to 3,200 international units. Five of the animals developed nymphomania. Some response which could be attributed to the treatment was obtained in 11 out of 12 animals. All the five animals with nymphomania were restored to normal behaviour. Of the 12 animals, seven became pregnant after a total of 11 services or inseminations. One animal responded with ovulation after a single injection of 1,000 i.u.—J. M. ROBSON.

MERCIER, E. (1946.) The effects of season on spermatogenic activity and reproduction in cattle.—*Thesis, Cornell.* pp. 100. 1907

A study of the seasonal effect on reproduction in cattle kept under the 45th, 47th and 49th degrees of latitude North in Eastern Canada revealed no statistically significant difference between months and locations as far as the number of services per conception or the percentage of fertile matings are concerned.

The highest breeding efficiency was obtained in summer and autumn months. This result was accompanied by a significant positive correlation between the percentage of fertile matings and the length of the day, the daily number of hours of sunshine, and the outside temperature for the months previous to matings.

The amount of daylight had a delayed influence at about two months on the breeding efficiency of cattle. Relatively high summer temperatures do not affect reproduction adversely in that area.

The author believes that the effects of season on the efficiency of reproduction of cattle is largely conditioned by the hours of daylight. Temperature is probably of lesser importance and its effect is superimposed on the seasonal trends due to the amount of daylight. Temperature is probably of little importance except when it is so high that the animals are unable to maintain their own body temperatures at the normal level.—H. L. GILMAN.

BONNIER, G., et al. (1946.) [The genetic control of the correlation of fat, protein and

lactose in milk.]—*Acta agric. Suecana.* 2. 171. [Abst. from abst. in *Schweiz. Arch. Tierheilk.* 89. 206-207. (1947.)] 1908

There is a definite relationship between the fat, protein and lactose content of the milk in uniovular twins only. This correlation of the various components of milk is controlled genetically, does not occur in other animals and is not influenced by environmental factors.—C. A.

ROUX, P. (1947.) Action du propionate de testostérone sur le comportement maternel de la poule domestique. [The action of testosterone on brooding hens.]—*C.R. Soc. Biol. Paris.* 141. 1100. 1909

Ten hens of a breed (Gâtinaise) with very strong broody instincts and which were rearing young chicks which they had incubated were injected with 20 mg. of testosterone propionate. On the day following the injection the hens ceased to take any interest in the chicks and refused to brood them.—M. C.

MUNRO, S. S. (1946.) Relative influence of heredity and environment on fertility and hatchability in Wyandottes.—*Emp. J. exp. Agric.* 14. 25-30. 1910

On farm No. 1 the average percentage of total eggs hatched over a ten-year period up to 1940 was 68, whereas on farm No. 2 during the same period the figure was 44.8%.

In order to test whether this difference in hatchability was due to heredity or environment 56 pullets were selected at random on each farm and 28 of these interchanged. The birds were placed in four pens each of 14 birds and each pen consisted of seven birds from each of the two strains. The birds were then maintained during the winter and mated with a home-bred cockerel in spring. Four settings were made on each farm in March and April and individual records kept. Settings were at weekly intervals at farm No. 1 and spaced from 8-18 days at farm No. 2.

Analysis of the fertility and hatchability records of the two groups of birds on the two farms indicated that when environmental conditions were equalised the two strains did not differ in fertility and hatchability.—D. LUKE.

MONTY, L. (1946.) La sélection morphologique. [The morphological method of selection.]—*Rev. d'Oka.* 20. 203-211. 1911

M. discusses the correlation between conformation and production and studies the classification and production of cows listed in various American herd books, such as that of the American Holstein Friesian Association. In these records the cows in the highest classes as judged by conformation, have been the highest yielders both of

milk and of butter fat. The scale of points used in judging cattle therefore has some value in predicting production but this value is not great.

See also absts. 1761-1763 (trichomoniasis); 1809 (genetic factors in fowl sarcoma); 1888-1890 (sex hormones); 1937 (text-book on sterility).

ZOOTECHNY

WARE, F. (1947.) Indian cattle in the United States of America.—*Empire J. exp. Agric.* 15. 218-215. 1912

This is a very brief account of the part which Indian breeds have played in the development of beef cattle on range in the Southern States of the U.S.A. The Indian breeds which have been imported are mainly Kankrej, Haryana, Krishna Valley and Gir. In America these are all named Brahman and are all included in common stud books. Wildness is a common fault in cross-bred animals. W. suggests that wildness could be avoided by importing the more docile breeds such as the Sahiwal. He also advises the Sahiwal as a means towards the development of a dairy breed suitable for the tropical areas of America.

There is brief mention and two photographs of the Santa Gertrudis breed developed at the King Ranch Texas.—M. C.

WILLIAMS, D. W. (1947.) Animal husbandry in Continental Europe.—*J. Anim. Sci.* 6. 217-224. 1913

European standards of health are low. War-time reductions in numbers were comparatively small. The Balkans and Poland suffered great reductions and military, political and agricultural conditions make recovery difficult. Italian standards are low and numbers were reduced 20%. Norwegian reduction was slight and quality maintained. Denmark's excellence and progressiveness in animal breeding and feeding brought surpluses at the end of the war. Holland suffered reductions in numbers, has insufficient land but maintains high yields. Belgium's agriculture, helped by rural urban co-operation and hindered by land parcelment, has 66% of her cattle infected with tuberculosis. Variable land and obstinate peasantry accounts for backward methods of animal husbandry in France. Cattle, sheep and pigs suffered wartime reductions and present yields are low. Government supported horse breeding progresses satisfactorily. Government supported Swiss agriculture maintains high standards of husbandry and disease control. German agriculture, designed for national security, showed pre-war low milk yields, high pork production and increased wool production.

Versatile breeds of cattle, soil conservation and first-class personnel for agricultural education are needed at present. The suitability of European

breeds of animals for export to America is discussed.—A. G. WARREN.

HEINEMANN, B. (1947.) The relation of per cent total solids in separated milk and per cent fat in whole milk to atmospheric temperature.—*J. Dairy Sci.* 30. 757-762. 1914

This report, based on work carried out at Springfield, Missouri, reveals that variations in atmospheric temperature from day to day are large enough to be significant in their effect on total solids of separated milk and the fat content of whole milk. The results have been statistically studied and show that the fat content is affected to a greater extent by temperature than the total solids content. The statistical methods used are those described by Snedecor (1946). The mean daily temperatures were correlated with the mean daily fat tests of the whole milk received and of the mean daily total solids of the separated milk. For the year 1946 there was an increase of 0.067% in the total solids of separated milk and an increase of 0.093% fat in the whole milk for every 10°F. decrease in atmospheric temperature over a range of 35-79°F.—MALCOLM WOODBINE.

MINETT, F. C. (1947.) Effects of artificial showers, natural rain and wallowing on the body temperatures of animals.—*J. Anim. Sci.* 6. 35-49. 1915

Experiments were conducted on buffaloes, zebu cattle, small hill cattle and sheep at an altitude of 7,500 ft. in the Himalayas and at plains level. Artificial showers were produced on the second and fourth days by sprays delivering the equivalent of 5-10 in. per hour of rain for heavy showers or 0.5-0.6 in. per hour for light showers, the temperature of the water generally being adjusted to about 55°-60°F. Rectal temperatures were noted every 30 min. during the shower and for as long as necessary (usually 2-4 hours) during the drying period. Observations were made on the first and third days providing the control.

In water buffaloes there was a rapid fall in temperature as soon as rain or wallowing started, this fall ranging from 2.8°F. in the morning to 1.6°F. in the afternoon. The drying period was rapid and did not produce a further fall in temperature. Zebu cows appeared to dislike artificial showers and the rain produced little or no fall in temperature, but a small (0.5°F.) fall occurred, mainly during the drying period.

Natural monsoon rainfall decreased the body temperature of hill cattle 0.7° - 2.7°F . at Izatnagar and of sheep 1.4° - 2.7°F . at Mukteswar.

The temperature of rain water (21 observations) at Mukteswar, between July 1st and September 18th ranged from 57° - 67°F . and averaged 61°F . At Izatnagar, three observations made in December, 11 in January and 43 in July and August ranged between 61° - 62°F . 48° - 59°F ., and 75° - 82°F . with averages of 61.5°F ., 52°F . and 78°F .

Hosing buffaloes for three minutes was found to be as effective as wallowing for 20 min.; splashing for 10 min. was not quite as good. A shower bath is suggested for dairies as being cleaner and cheaper than a constructed wallow.

—G. L. BAILEY.

SEATH, D. M., & MILLER, G. D. (1947.) **Repeatability of heat tolerance observations.**—*J. Dairy Sci.* 30. 957-962. 1916

Observations of the respiratory rate of 20 milking Holstein cows was made while the cows were at pasture and again from 5-10 minutes after they had gone into the milking sheds. Rectal temperatures were taken after the cows had entered the shed. Thirteen of the cows averaged a higher figure after entering the shed, this was considered to have been caused by the exercise of walking to the shed. When the cows were tested in order of respiratory frequency before and after entering the shed each cow generally occupied the same position in each test.

It is concluded that respiration observations made in the shed are as reliable as those taken at pasture and that averages based on observations made on six or seven relatively warm days would be sufficiently accurate in selecting cattle for degree of tolerance to heat.—M. C.

SINHA, K. C., & MINETT, F. C. (1947.) **Application of water to the body surface of water buffaloes and its effect on milk yield.**—*J. Anim. Sci.* 6. 258-264. 1917

It is the usual practice in buffalo dairies in India to cool buffaloes either by permitting them to wallow in water once or twice a day or to splash them with water from buckets. Observations were made to determine the effect of these practices on milk yield. Twenty-two buffaloes at the height of their lactations were used and the experiments extended over a period of 40 days.

The buffaloes were splashed with water for five minutes each morning and evening and body temperatures were recorded immediately before and 30 minutes after splashing.

The results show that buffaloes which had been splashed gave slightly higher milk yields than those which had not been splashed.—M. C.

CLARK, R., & QUIN, J. I. (1947.) **The effect of diet and body condition on the heat regulating system of the merino sheep.**—*Onderstepoort J. vet. Sci.* 21. 317-327. 1918

Sixteen castrated male sheep were used, eight of which were in good condition and eight in poor condition at the beginning of the experiments.

The *scale of nutrition* :—The sheep were arranged in four groups (a) on an ample diet throughout, (b) on an ample diet followed by a period on a poor diet, (c) on a poor diet throughout and (d) on a poor diet followed by a period on a good diet. Records of body weights, rectal temperatures and atmospheric temperatures and respiratory rates were kept. The reactions of the sheep to both cold conditions overnight and hot conditions during the day were studied.

The sheep on the poor diet were thin but healthy, they had subnormal rectal temperatures in the morning and a slow respiratory rate. An immediate rise of body temperature occurred in the early morning when the "poor" sheep were given an adequate diet. Sheep in good condition were able to maintain their body temperature on exposure to cold for some considerable time when suddenly put on an inadequate diet. When exposed to heat thin sheep on a poor diet had an excessive rise in body temperature and the panting reflex was suppressed. Thin sheep on a good diet had a normal panting reflex but there was an excessive rise of body temperature. It is clear from these experiments that diet and bodily condition markedly influence the heat regulating mechanism of sheep and that this occurs without any clinical disturbance of digestion or appetite.—M. C.

— (1948.) **Horns mobile at the root.** [Questions & Answers.]—*Vet. Rec.* 60. 187-188. 1919

To the question whether there is any explanation for horns which are mobile at the root in cows the answer is given that no definite explanation is known to the writer. Irregular growth of the horn corium is suggested as a possibility. [Loose pendulous horns are not uncommon to some breeds of Indian cattle and a hereditary factor seems to be involved.]—M. C.

WIANT, D. E. (1945.) **Dangers of the home-built electric fence controller.**—*Quart. Bull. Mich. agric. Exp. Sta.* 27. 261-265. 1920

A type of home-made equipment for electric fencing consists of a two-pin plug, an ordinary electric light bulb and insulated wire. It is plugged in to an ordinary lighting circuit. Such devices are said to be in common use on farms in Michigan and other states. Such devices are ineffective when the ground is dry and very dangerous when the ground is wet. Deaths of human beings and of animals have been caused by these devices and farmers are warned against them.—M. C.

TECHNIQUE AND APPARATUS

YOUNG, L. (1947.) A micropipette suitable for the cutaneous application of vesicants.—*Canad. J. Res. Sect. E.* 25. 137-140. 1921

The pipette was made from pyrex capillary tubing. Through a rubber stopper it was fitted into a barrel made from a pyrex (125 mm. x 15 mm.) test tube. To the latter was attached a side arm 20 mm. from the closed end, and a 4 mm. hole was blown 20 mm. from the open end, and on the opposite side to the side arm. A rubber tube fitted with a small bulb is attached to the side arm. The instrument is held as a pen. The amount of negative and positive pressure for filling and emptying the pipette is controlled by covering the 4 mm. hole with the index finger. When calibrated to deliver 1.0 mg. and 5.0 mg. of vesicant the mean deviation was 0.02 and 0.01 respectively.—P. J. G. PLUMMER.

KOLFF, W. J., & BERK, H. T. J. (1944.) The artificial kidneys: a dialyser with a great area.—*Acta med. scand.* 117. 121-134. [In English, authors' summary slightly amended.] 1922

The artificial kidney is a dialysing-apparatus with a small blood volume and a dialysing area of about 20,000 sq. cms., in which the blood of a patient is cleared of retention products.

With one patient 24, 40 and 35 grams of urea were dialysed out in 1.5, 4, and 6 hours respectively. Other retention products were removed by dialysis as well. This could be demonstrated for: residual N, urea, uric acid, creatine and indoxyl.

We believe that patients suffering from uremia and anuria can be kept alive so long as blood-vessels for puncture are available.

In the case of acute uremia the possibility exists for the kidneys to regenerate in the meantime. Sulfamethylthiazol and other substances with small molecules (poisons!) may be removed by dialysis as well.

SERRA, J. A. (1947.) A simple method for squashing and mounting preparations after any strain.—*Stain Tech.* 22. 157-159. [Author's summary copied verbatim.] 1923

A method is described for the squashing and permanent mounting of preparations, similar to the nucleal squash technic, to be used after hematoxylin, coal tar dyes and other stains. The colored pieces are immersed in glycerin, squashed or smeared, the glycerin is slowly removed with water by capillarity and the water is afterwards similarly substituted by alcohol. The cover glass is then removed and after a rapid rinsing in alcohol the materials are permanently mounted in alcohol-soluble resin.

ROSENBAUM, R. (1947.) Phloxine as an histo-

logic stain, especially in combination with hematoxylin.—*Stain Tech.* 22. 149-153. [Author's summary copied verbatim.] 1924

A staining schedule employing phloxine as a counterstain to Erlich's acid hematoxylin is presented. Fixation is best with Zenker's fluid, although formalin can be used. The technic is similar to the standard hematoxylin-eosin formulae but because of the staining advantages of phloxine over eosin, the technic is simpler, and quicker, resulting in clearly differentiated sections which do not fade as soon as do eosin-stained slides. A brief summary of the uses of phloxine as a biological stain is given and its advantages over eosin are discussed.

LHOTKA, J. F., & DAVENPORT, H. A. (1947.) Differential staining of tissue in the block with picric acid and the Feulgen reaction.—*Stain Tech.* 22. 139-144. [Authors' summary slightly amended.] 1925

The authors have found a modification of the Feulgen reaction to be a satisfactory stain for tissue in the block.

Pieces of fresh mammalian tissue not thicker than 5 mm. are fixed for approximately 48 hours at 25°C. in a mixture of equal parts of 5% aqueous sulfosalicylic acid and saturated aqueous picric acid. They are washed in distilled water and placed in Feulgen's staining solution diluted to one-half strength with distilled water. The staining solution is allowed to act for 24 hours (2 to 3 mm. thick blocks) up to 48 hours for 5 mm. thickness. After staining, the specimens are transferred to a mixture of sodium bisulfite, 0.5 g. and N hydrochloric acid, 5 ml. in 100 ml. of distilled water. Two changes of 15 to 30 min. each in the acid sulfite are given and these are followed by dehydration in alcohol. Nuclei stain reddish violet against a lemon yellow background when the stain is typical. Orange G, 200 mg. per 100 ml. may be added to the fixing fluid if a more polychromatic effect is desired.

WELLS, W. F. (1948.) On the mechanics of droplet nuclei infection. I. Apparatus for the quantitative study of droplet nuclei infection of animals.—*Amer. J. Hyg.* 47. 1-10. [Author's summary copied verbatim.] 1926

An improved apparatus for the quantitative study of experimental air-borne infection and disease offers a safe method for simultaneous administration of predetermined doses of air-borne infection to rabbits, up to the number of 6; and it is also adaptable to infection of other animals by the respiratory route.

The instrument has been calibrated for the administration of marginal doses in quantitative

experimental pathology of tuberculosis; in the quantitative study of the behavior of inhaled particles in different states of aerosol suspension, as indicated by pulmonary tuberculosis in rabbits; the quantitative study of compound infection and reinfection by a natural route; and in quantitative study of the dynamics of experimental air-borne infection and disinfection.

PUKANIĆ, I. (1941.) Mielografija kod psa.
[Myelography in the dog.]—*Vet. Arhiv.* 11.
484-452. [Abst. from German summary.] 1927

Lumbosacral and suboccipital injection of 20% and 40% iodipin [iodized sesame oil], thorotrast [a stabilized colloidal thorium dioxide solution] and "perabrodil" [composition not stated] were tried with dogs in order to test their suitability for purposes of myelography.

20% or 40% iodipin was a very good contrast medium and was equally suitable for suboccipital and lumbosacral injection.

Thorotrast was a good contrast medium, but only for lumbosacral application, since in suboccipital use it brings about too severe reactions.

"Perabrodil" gives only weakly delineated shadows and is not suitable for suboccipital use on account of severe reactions.

Artificially induced haemorrhages in the subdural space could regularly be established by iodipin, which either penetrated to the site of the haemorrhages or indicated by contrast shading the parts effused by haematoma.—F. E. W.

DANTCHAKOFF, V. (1947.) Petit dispositif facilitant l'obtention dans l'organisme d'effets continus d'hormones. [Method for obtaining continual action of injected hormones.]—*C.R. Soc. Biol. Paris*, 141, 11-12. 1928

The substance in paste form is put into a small celloidin tube into which several holes are made. The tube is then introduced subcutaneously by means of a steel instrument. The action of the substance under these conditions is very prolonged. D. believes that celloidin should be replaced by a substance which would be gradually absorbed in the body.—J. M. ROBSON.

GREAVES, R. I. N. (1946.) The preservation of proteins by drying. With special reference to the production of dried human serum and plasma for transfusion.—*Spec. Rep. Ser. med. Res. Coun., Lond.* No. 258. pp. 54. London: H.M. Stat. Off. 2s. 1929

Freeze drying is admirably suited to the preservation of many biological fluids. The basic principle of freeze drying relies on sublimation from the frozen state, the resultant product being light, friable and capable of ready re-solution, in contrast with drying from the liquid state when the product results in glue-like scales, relatively

insoluble. The low temperature appears to delay denaturation of the proteins, and drying from the solid state obviates the formation of concentrates of salts leading to aggregation of protein molecules, the first stage in denaturation.

The procedure of freeze drying is divided into two stages (1) primary desiccation in which the bulk of the water is removed from the frozen material, leaving a relatively dry powder, (2) secondary desiccation involving the drying of the powder. The ultimate preservation depends upon the latter, and to be good is dependent upon the efficiency with which this stage is carried out. It is a lengthy procedure and must be concluded by perfect hermetic sealing to prevent re-wetting of the powder.

Some compromise was necessary to obtain these desiderata under war-time conditions, and they have mainly proved adequate as a short-term war-time policy. With blood-typing sera preserved in small amounts for storage under tropical conditions no compromise was permissible, and as it was not possible to turn out a perfectly dried product the condition of durability was adopted that the serum should not lose more than half its potency during five hours' boiling. Where standard reagents are required it is particularly important to pay attention to the secondary desiccation.

The need for human sera and plasma for transfusion purposes and for penicillin drying stimulated progress in the field of primary desiccation. The problems involved consideration of preliminary freezing of the material, the maintenance of a high vacuum against the evolution of water vapour during the drying process and the supply of latent heat of evaporation to the subliming solid.

Preliminary freezing was necessary to avoid the violent frothing of liquid introduced into a vacuum. Both the appearance and solubility of the dried product depend upon the methods used for pre-freezing the liquid; these should be such that freezing is rapid with the formation of small crystals. This can be accomplished by baths of solid CO₂ "dry-ice", and on the large scale, by alcohol baths refrigerated mechanically to -60° to -70°C. If during freezing the bottle is rotated on a nearly horizontal axis and the liquid is frozen round the inside periphery of the bottle a more optimal surface to depth ratio is given and hence shorter drying time ("shell-freezing"). An alternative procedure is to freeze in air-draught at -18°C., the bottles being rotated at high speed on their vertical axes. Thus a cone is forced down through the liquid and the liquid freezes around the inside periphery as in shell-freezing. This method has all the advantages of the use of a higher temperature than shell-freezing, and is

called high-speed vertical spin freezing. If this latter type of spinning is carried out in a vacuum chamber frothing is avoided and evaporation-freezing occurs. This process becomes the first stage of the drying process itself and pre-freezing is unnecessary.

For maintenance of an adequate vacuum during primary drying desiccants such as P_2O_5 , $CaCl_2$, $CaSO_4$ and silica gel have given good results on a small scale, but are either too bulky or too costly for large-scale work. Direct pumping can be used although the size of the pump has to be greatly increased and means must be provided for removing the water vapour from the oil of the pump as in the "desivac process"; for large-scale work 4- or 5-stage steam ejector pumps are generally used. The refrigerated condenser is the most efficient of all methods for removing water vapour; on a small scale liquid air or dry ice are widely used, but on the large scale mechanically refrigerated condensers are generally employed.

The speed of drying depends on the rate at which latent heat of evaporation is supplied to the frozen material and a number of interrelated factors are involved. The design of the container in which the material is to be dried is of primary importance and various types of containers are

discussed in this connexion. The application of the required heat is a very controversial subject, but it appears that the method of choice is the direct conduction of the energy and this is also easiest to arrange. Di-electric heating appears to offer no advantage. For rapid drying the depth of frozen material in relation to surface area must be low, and the depth should not exceed 1 cm. if a 24-hour drying period is desired.

It is emphasized that most of the methods and apparatus described in the report were devised for war-time production to meet war demands for dried materials, and hence much of the work was of an *ad hoc* nature with compromises to meet war-time conditions and shortages. Difficulties were often encountered in applying the small-scale laboratory method to large-scale production.

As a result of these experiences it appears that primary freeze drying now presents no serious problems. Centrifugal vacuum spin freezing offers decided possibilities for large-scale work and the difficulties and defects of the drying technique relate more to secondary drying and package of dried material. More information is required on keeping qualities of different materials with varying residual moisture contents and the ideal type of container still awaits perfection.—A. E.

MISCELLANEOUS

ANON. (1947.) Rapports de groupe de la F.A.O. sur la Santé animale. [Group reports of the F.A.O. on animal health.]—*Bull. Off. internat. Epiz.* 27. 230-283. 1930

This is a press communiqué issued after the meeting of the veterinary sub-committee of F.A.O. held at Washington in April, 1947.

Eight nations were represented and the committee considered that F.A.O. should endeavour to promote and co-ordinate national and international efforts rather than assume responsibility for a programme. Avianized rinderpest vaccine was mentioned as a product which F.A.O. should collaborate in distributing and producing for use in such countries as Egypt, Kenya and Siam. The possibility of establishing an international laboratory for the study of rinderpest was considered.

Other subjects considered were collection of information on vaccines and the testing of new vaccines, the acclimatization of improved breeds of livestock in tropical and sub-tropical climates, the shortage of trained veterinarians and rules and regulations governing inter-state movements of livestock.—M. C.

CUNNINGHAM, E. R. (1947.) UNESCO initiates cooperation in the abstracting of biological and medical sciences.—*Science*. 106. 609-611. 1931

This is an account of a conference convened at Paris in October 1947 by UNESCO. Suggestions were made for measures to avoid overlapping by different organizations, the merits of "authors' abstracts" versus "critical" abstracts were discussed and it was recommended that an interim co-ordination committee on medical and biological abstracting be set up under UNESCO.

—M. C.

DICKINSON, E. M., & CLARK, W. G. (1946.) Brooder-stove-residue burns on turkey pouls. —*Cornell Vet.* 36. 814-817. 1932

Severe dermatitis of the head, face, neck and back of turkey pouls was at first thought to be contagious but was found to be caused by a tar-like residue accumulating and seeping out of the chimney of stoves in brooders. In all cases the fuel used in the stoves was briquettes. The residue caused a mild burn and dermatitis within 24-48 hours after being placed on the skin, but if the birds are exposed to sunlight the condition is greatly aggravated and a third degree burn develops. Mortality in birds exposed to sunlight may be as high as 50%.

Prevention consists in reversing the chimney pipe so that residue does not leak from the joints. Affected birds should be kept out of the sun.

—M. C.

BOOK REVIEWS

WILLIAMS, R. T. [Senior lecturer in biochemistry, University of Liverpool]. (1947.) **Detoxication mechanisms. The metabolism of drugs and allied organic compounds.** pp. 288. London : Chapman & Hall, Ltd. 25s. 1933

The mechanisms by which the body detoxicates certain harmful substances arising during the process of normal metabolism are well known, e.g., the formation of ethereal sulphates or of hippuric acid, but the subject has now widened to such an extent that it has come to include the study of the chemical changes undergone by all organic compounds in the body whether they give rise to toxic metabolites or not. Indeed, in some cases compounds more toxic than the original arise during metabolism as for example the formation of the more toxic p-bromophenylmercapturic acid from bromobenzene or the *in vivo* reduction of nitro compounds to more poisonous substances so that the term detoxication may be somewhat misleading. Such findings are, however, of great importance owing to the wide range of organic compounds which are now used as therapeutic agents and whose metabolic fate is still uncertain.

After a brief survey of the main types of biochemical reactions used by the body, the metabolism of individual organic compounds, is dealt with, arranged in some twelve natural chemical groups ranging from aliphatic compounds and aromatic hydrocarbons to sulphones and organic compounds of arsenic. In bringing together the available information in such a clear and convenient form, the author has performed a most valuable service since as yet there is no general theory that can be applied to predict the fate of organic compounds in the body.—J. A. N.

BROWNING, E. [M.D., Ch.B.]. (1947.) **Modern drugs in general practice.** pp. viii + 223. London : Edward Arnold & Co. 2nd Edit. 12s. 6d. 1934

This book deals competently with a number of drugs widely used in general practice and certain modern additions which are being tried as alternatives. There are chapters on antiseptics, as well as on the sulphonamides and penicillin, and on gold salts. Cardiac drugs, sedatives and hypnotics, diuretics and urinary antiseptics, gastrointestinal remedies and drugs acting on the autonomic nervous system are discussed and there is a short section, almost an after-thought, on the antithyroid substances. As would be expected, the approach is essentially empirical rather than scientific and the reader is, for example, told that certain sulphonamides act on certain organisms without a hint as to why this should be so (which might be valuable). Sulphapyridine is still listed among the important sulphonamides for human

use. Important recent discoveries such as BAL and phryseptone are not mentioned, and among the anthelmintics santonin seems, curiously, to have been almost ignored. Nevertheless the book contains much valuable information for the busy general practitioner, clearly and simply set out. There is for example a table giving the proprietary remedies which contain amidopyrine, information not usually gathered together.—J. M. ROBSON.

MARTIN, C. R. A. [M.R.San.I.]. (1947.) **Practical food inspection. Vol. I. Meat inspection.** pp. viii + 816. 138 illus. London : H. K. Lewis. 18s. 3rd edit. 1935

Amongst the more recent works on meat inspection this book must take a high rank. The fact that a third edition has been called for since 1932, when the work was first published, is proof of this fact. In the preface to the first edition the author stated that in presenting the volume his aim was to present to inspectors, students and others interested, a work written by a practical inspector, and this certainly he has achieved. In the short preface to the third edition it is pointed out that because of the Food Ministry's partial centralization of slaughtering during the war, meat inspection in private slaughter-houses has ceased to be a routine measure. The war conditions, however, have of necessity lowered the standard of meat inspection in general, but it is now hoped that the reins of progress, as the author puts it, may be picked up from where they were dropped.

The book is arranged in nine chapters commencing with the physiology and comparative anatomy of the food animals and in this section is included a most useful table indicating in diagram, the flow of the lymph stream in the body. The next chapter deals with the indications of age in the various animals and the benefits of *antemortem* inspection. In indicating the best beef breeds of cattle the author strangely omits both the shorthorn and the Aberdeen angus.

In discussing general administration in meat inspection, the question of the public as against the private slaughter-house is debated and disadvantages of the former are stressed. An account is also given of the system of meat inspection and handling carried out during the late war.

As perhaps is only to be expected, the author rather belittles the agitation which has been going on for a number of years for a national veterinary meat inspection service and suggests that some of its supporters' criticisms against the present system have become rather worn. The author is on stronger ground when he describes the many physiological and pathological conditions met with in meat animals. This he does in a clear and

concise style and adds a note on the judgment indicated for each case mentioned. No less than 30 pages are given up to the description of tuberculosis and its spread as it affects the different organs of the body.

Fifty pages are allocated to animal parasites, both external and internal, but one cannot but feel that the author attempts too much and tries to make the work a general veterinary text-book, as for instance he gives a description of keds as they affect sheep, which seems to be spreading the net too wide on a work on meat inspection. He also describes the tuberculin test and gets rather mixed up between the subcutaneous and the intra-dermal tests; he speaks about ticks as "insects" refers to the Sheep Scab Order of 1920 instead of 1938, and he states that sheep pox is "only rarely met with in the United Kingdom".

Apart from these points, however, the book can be well recommended for the purpose for which it was written. The author has the undoubted gift of presenting his subject-matter in a logical and very forceful manner. Two unusual but most useful tables are included, in the description of the various butchers' joints, when the bones included and the lymph glands involved in each joint, are shown diagrammatically. The volume ends with a glossary containing more than 240 scientific terms and there is an excellent alphabetical index of the matter dealt with.

—D. S. RABAGLIATI.

MARTIN, C. R. A. [F.R.San.I.]. (1948.) *Practical food inspection. Vol. II. Fish, poultry and other foods.* pp. viii + 284. 57 illus. London : H. K. Lewis. 3rd edit. 18s. 1936

This work is a corollary to the author's book on meat inspection, to which it is the second volume. He has succeeded in incorporating into the one volume an immense amount of information and in this, the third edition, the legislation and the more recent improvements in the preservation and the processing of foodstuffs have been brought up to date. Practically all food consumed by the public, except butchers' meat dealt with in the first volume, has been included.

The plan of the book is to give a short description of each foodstuff, its origin, preparation and chief characters and then to describe the possible defects, parasitic infections, diseases and methods of their detection.

A clear description, often accompanied by illustrations, is given of the common edible fish, brought to or caught around our shores. An excellent account of fruit, vegetables and cereals is given and we would especially recommend the chapter on canned foods and their inspection as specially practical. The section on milk and milk products, which extends to about fifty pages

closely follows the usual lines in similar works, but that under the heading of Miscellaneous Foods is a mine of detail about the condiments and foods we consume daily. It is somewhat disconcerting to read, however, under the heading of sausages, on page 176, that "the addition of bread or meal to sausages is for binding purposes and need not exceed from 3-5%, but being cheaper it is often added to the extent of 70, 80 or even 90%. In this proportion it is really an adulterant and occasions the use of colouring matters to give the mixture the appearance of a meat product".

The difficult subject of food poisoning is presented in a very readable form and is followed by a chapter on legislation. This must prove of great utility to those who require to look up the various legal enactments and will save much time and trouble in hunting through legislation, which even despite the new Food and Drugs Act of 1938, is still somewhat scattered.

As in the first volume, the author seems to fail somewhat in his references to stock. For example, in discussing the feeding of dairy cows on page 117, one cannot but wonder if he does not put too much stress on the probability, or even possibility, of the diet having much influence on the fat content of milk, either by poor or good feeding, and on page 26 he falls into the error of confusing septicaemia haemorrhagica in deer with cattle plague. On page 161 he states that although accredited herds are not tuberculin-tested, the occurrence of tubercle bacilli in milk samples from this class of herd is rare, a state of affairs, unfortunately, not by any means always borne out by facts. He goes on to make the following statement which is far too sweeping, that "Wide powers had been given to County Councils and other authorities under the various enactments to require the slaughter of every cow suffering from tuberculosis and in many parts of the country these powers were beginning to be efficiently enforced, when an organized State veterinary service was introduced." The writer did not make it plain that it was only to certain types of tuberculosis that these powers applied, and indeed still apply and are now enforced by the Ministry of Agriculture instead of by local authorities.

Two other oversights may be mentioned; in enumerating the breeds of cows likely to produce milk rich enough to pass the butter fat standard, he mentions Shorthorns along with the Channel Island breeds, but omits the Ayrshire and the Red Poll. He also calls attention to the fact that cows treated with prophylactic vaccines against contagious abortion are capable of secreting the organisms in their milk, but he does not mention that the vaccine now almost universally used, "strain 19", does not have that result.

Despite these points we would recommend this book to all food inspectors, whether they be medical officers, veterinarians, sanitary inspectors or students. A glossary of scientific terms, in addition to those included in volume 1, is appended before the alphabetical index at the end of the book.

—D. S. RABAGLIATI.

Edited by ENGLE, E. T. [Ph.D.]. (1946.)

Proceedings. Conference on diagnosis in sterility sponsored by the National Committee on Maternal Health. pp. xi + 237. Oxford: Blackwell Scientific Publications, Ltd. 25s.

1937

This book deals with the problem of sterility in the human subject so much of it is not of direct veterinary interest. In the diagnosis of infertility in the male, testicular biopsy appears to be utilized more frequently than it is in veterinary practice although the interpretation of the findings appears to be still a matter of considerable controversy.

In examination of specimens of semen motility is not estimated before 30 minutes have elapsed from the time of ejaculation, this interval being necessary to permit the motility to reach its highest level; viscosity tests are not apparently considered of great value; abnormally high volume of the ejaculate is associated with sterility. Knowledge of the factors concerned in sterility in the female seems to be fragmentary. The complexity of the subject is illustrated by the recommendation of one of the speakers that "Semen analysis and its clinical evaluation are essentially valueless unless correlated with the following investigations of the individual being studied:—careful complete history; careful complete physical examination; thorough urological study; blood studies, including a blood count, haemoglobin, smear, Wasserman test and Rh determination; basal metabolism rate; urine analysis; post-coital examination of the cervical mucus; and prostatic smears." Such a gamut of tests and examinations would seldom be practicable or economic in veterinary practice.

The general impression one gets from reading this book is that in diagnosis present knowledge is only on the fringe of the subject while treatment is almost entirely empirical.—M. C.

Edited by SMITH, A. [M.D.]. (1946.) **Medical research. A symposium.** pp. 169. Philadelphia, London & Montreal: J. B. Lippincott Co. 30s.

1938

The topics discussed consist of fundamentals of medical research; some practical aspects of research; the laboratory; manufacture and development of new drugs; medical research in

the university medical school; clinical research with a notebook; the publicizing of scientific research; and photography in medical research.

The book furnishes a picture of the state of medical research in America at the present time but one is left with the impression that it is mainly concerned with medical research directed towards the production of new drugs for the cure of disease. Indeed, one of the papers, that by Clough, starts with the statement that "the benefits of medical research may be said to culminate with the pharmaceutic manufacturer." Such a statement seems to ignore that great body of research directed towards the prevention of disease.

Those interested in the essential groundwork for successful research will find the contributions by Sollmann and by Boyd of special interest and value. The other contributions deal mainly with the mechanics of research and will be of particular interest to readers wishing to compare American methods with those of other countries.—M. C.

STEPHENS, G. A. [M.P.S.]. (1947.) **Hormones and vitamins.** pp. xii + 315. London: George Newnes, Ltd. £1 1s.

1939

This comparatively small book contains a remarkable amount of information about the hormones and vitamins. The author discusses their chemistry, physiological actions and clinical use, and in addition finds space to deal with such general questions as the relation between hormones and vitamins and the function of "trace elements" as hormonal and enzymatic prosthetic groups. The information is really up to date. As examples of this may be quoted the discussion of the hormones of the adrenal cortex and the relation of the oxygen atom in position C₁₁ to the activity of these substances; and the section dealing with the functions of pyridoxine and pyridoxal, the phosphorylated aldehyde of pyridoxine which is the coenzyme of tyrosine decarboxylase and of several other enzymes. Occasionally emphasis is not placed on the important aspects of the functions of certain substances, e.g., in the case of ascorbic acid. There are a few minor errors, e.g., in Fig. 4 which shows that the uterine muscle is insensitive to the posterior pituitary hormones during the luteal phase of the cycle, though this has now been conclusively disproved. Fig. 7 shows much less pregestational proliferation than is usually obtained with one unit of progestin. But these are minor matters and the book should be very useful to those who want much reliable and up-to-date information about vitamins and hormones compressed into a very small space.

—J. M. ROBSON.

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